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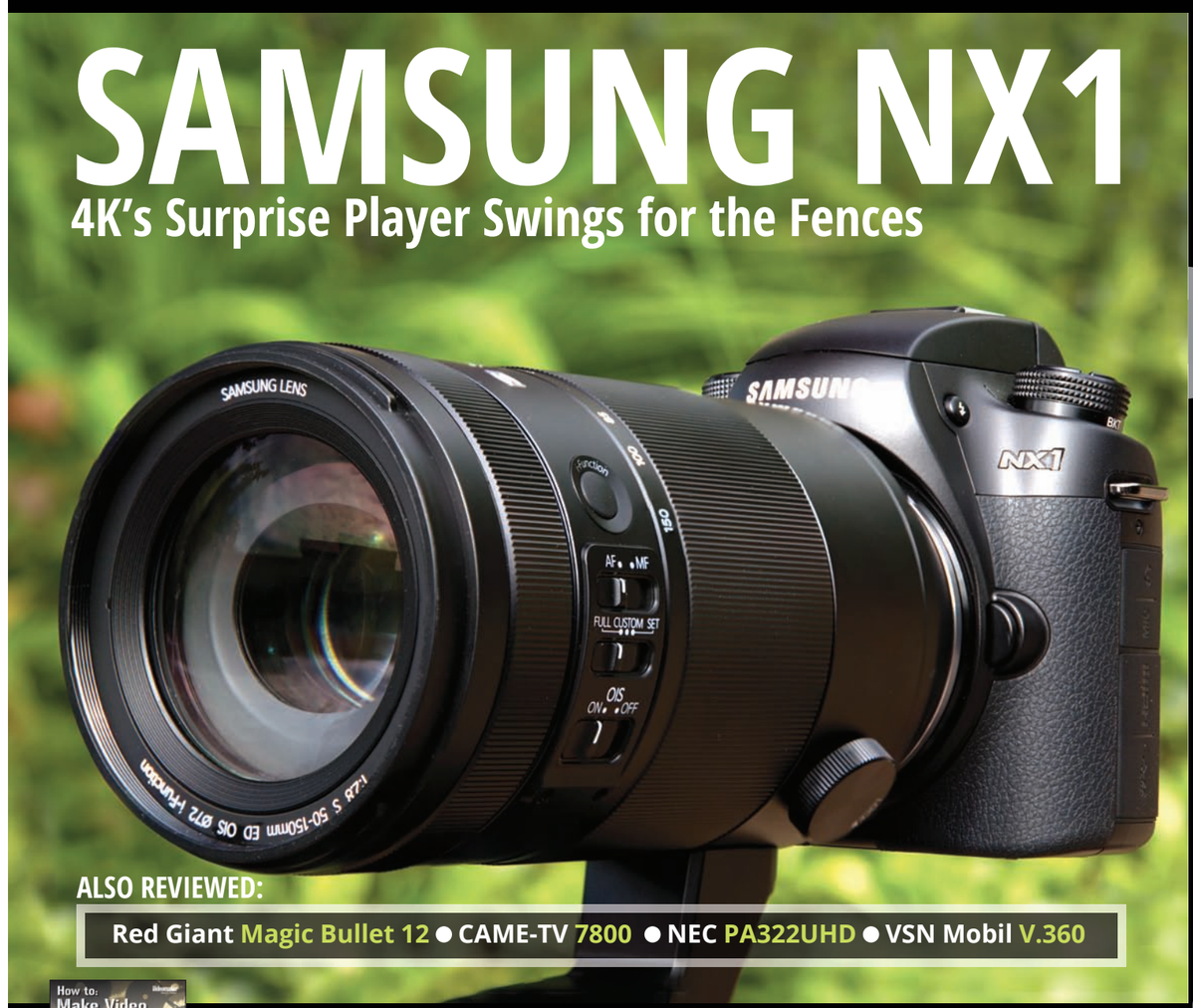
Videomaker®
YOUR GUIDE TO CREATING AND PUBLISHING GREAT VIDEO JUNE 2015

# SAMSUNG NX1

## 4K's Surprise Player Swings for the Fences

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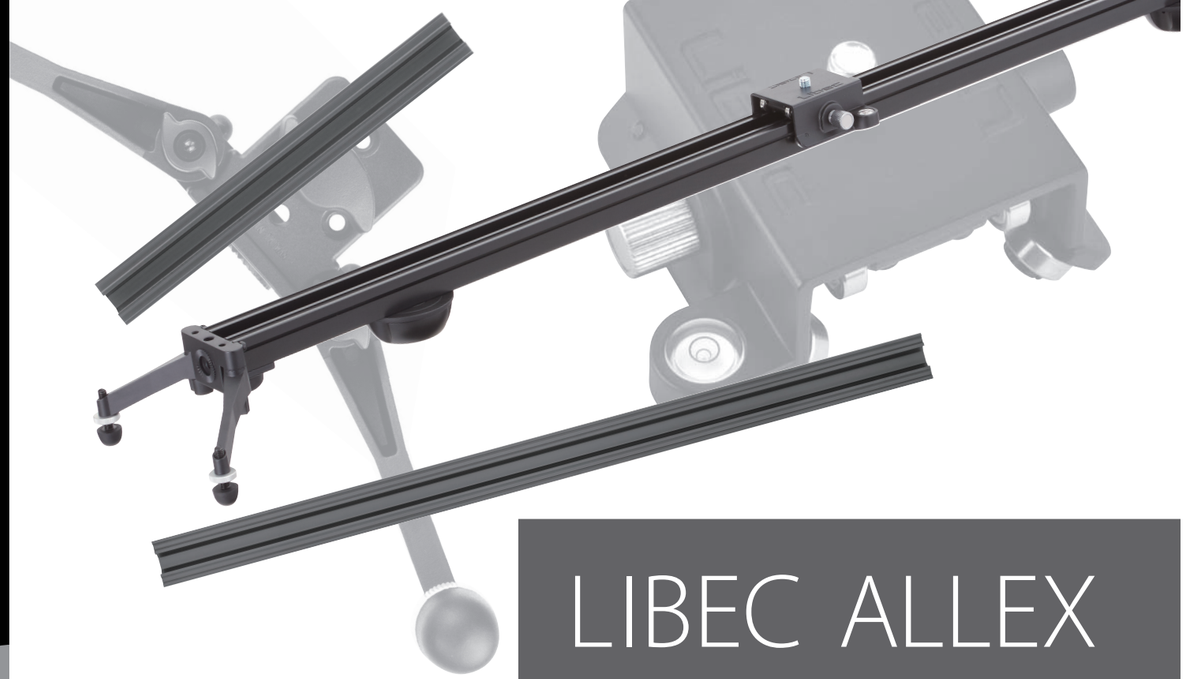

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by Matthew York

# A Simulated Lens

When you think of the production process, you might initially imagine camcorders, clapboards, tripods, lighting configurations, microphones and cables. You may envision talent, takes, teleprompters, studios and sets. While all of these tools are useful, you can actually produce a very effective video without any of these things. You probably already have. Open up any computer editing application, and you can assemble music, text, graphics, digital images, art, animations and transitions into complete video without ever touching a light, camera or microphone.

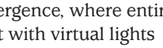
Clearly, making video is broader in scope than can be summarized by traditional acquisition actions. The range of technologies and sources of content that contribute to media creation are expanding faster and faster, and in the process, video production itself is being redefined. Thanks to the innovations behind Oculus Rift and similar virtual reality (VR) headsets, we may well see the introduction of virtual reality programing and virtual reality video production in our lifetimes.

Presently, the idea of VR may bring to mind uses primarily for training or gaming. Yet the rapid advancement we have seen in 3D game engines is sure to impact the world of video. The new age of Virtual Reality Media (VRM) will enable media creators to build virtual worlds and environments, and quite possibly virtual actors, that are so authentic looking that the viewer cannot tell the difference between animation simulation and live-action reality. The modeling, textures and motion in today's top 3D games are already almost there (not quite, but almost), and they are rapidly improving.

Rest assured, game developers are not the only ones thinking about this convergence of realistic 3D rendering, the immersiveness of virtual reality experience and visual storytelling. 3D graphics and render engines are without doubt leading us towards a new era in convergence, where entire movies will be lit with virtual lights and shot with virtual cameras, without any of the physical limitations or costs associated with locations, crews, talent or equipment.

Like all fledgling technologies, VRM will have its advantages and disadvantages. Virtual cameras and simulated lenses will need to evolve to create images that more closely resemble glass, depth, and field of view in a way that the human brain accepts without question. The implementation of branching plot lines that change the story based on viewer feedback will present new challenges in script development. The very structure of visual storytelling, which typically begins with a sequence of establishing shots that lead the viewer into the story, will need to be reimagined in an environment where the viewer may move within the scene.

Even so, I believe virtual reality media will have its day, allowing filmmakers to create immersive experiences where viewers can enter into and interact with simulated environments that will revolutionize visual storytelling.



Matthew York is ***Videomaker***'s Publisher/Editor.

You can comment on this article by going online: www.videomaker.com/article/17831

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June 2015

# What's on *Videomaker.com*

### The Videomaker Community Speaks Out

**Question:**

**movieman1005**: I am trying to find the best way to organize my files so I can edit with speed and efficiency. I've heard some people say you should put your footage on an external hard drive and put your project files and software on the internal hard drive. I have a large external drive that is USB 3.0, but would it be faster to put everything on the internal drive while I'm editing and store it on the external later? I haven't gotten my new computer yet, but I'm trying to decide if I should get a larger SSD to put footage on while I'm editing a project, in case that makes it faster to edit without freezing or glitching.

**Reply:**

**BruceMol**: The faster the drives the better, of course, but there are also bottlenecks to consider. I keep my programs, inputs and outputs on separate drives; that has helped for rendering tremendously. However, for glitch-free editing of multiple lines of HD, your RAM and your graphics card(s) are perhaps more important. I didn't start with 3 drives, two video cards and 24GB of RAM. When I bought a new computer a few years back, I made sure the chassis had room for extra everything AND made sure the power supply could drive all those devices. Then I added as I made money on video.

*See more at: videomaker.com/r/804*

### Samsung NX500 First Impressions Review

We spent some time shooting video with the NX500, and while this isn't a complete review of the NX500s footage, watch our first impressions of the camera.

*videomaker.com/r/801*

### Sony FE PZ 28-135mm f/4 Power Zoom Lens - Unboxing

Sony was nice enough to let us get the first look at the Sony FE PZ 28-135mm f/4 Power Zoom Lens. You read right... Power Zoom! Aperture, Focus and Zoom rings, Image Stabilization and more.

*videomaker.com/r/803*

### NAB 2015 Coverage

Can't wait until our NAB coverage hits print? You can see everything, including video coverage and our Best of NAB awards, online today by visiting *videomaker.com/r/800.*

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# NEW GEAR

## Two Striking New Camcorders from NAB 2015

### Canon Introduces XC10 4K Digital Camcorder

New from Canon, the XC10 4K Digital Camcorder can record both Full HD (1920 x 1080) and 4K video (3840 x 2160). Plus, the XC10 is capable of capturing 12 megapixel stills and is also able to extract 8 megapixel stills from 4K recorded video.

4K 30p movie playback can be accomplished through the HDMI 1.4 output port. The camera can record in Canon Log Gamma, Wide DR or EOS Standard picture modes and can match looks with footage from other Cinema EOS camera systems. The 2.3 lb. camera has a built-in ND filter and microphone, ISO speeds of 160 to 20,000 and employs optical image stabilization with a 10X wide-angle zoom lens plus 2X digital tele-converter. Continuous focus uses Face Detection while manual focus employs a dedicated focusing ring and a conveniently placed Push AF button.

For still photography, shooting speeds can reach up to 3.8 fps. The variable angle capacitive touch-panel LCD monitor works in tandem with a rotating handgrip.

Dual-band wireless networks provide remote camera operation control through a web browser or mobile device, as well as the ability to preview recorded images remotely. The June 2015 launch will see an estimated retail price of $2,500.

### Panasonic AG-DVX200 Comes in Crimson

Panasonic shows us how its camera adapts to new technology at NAB 2015. The AG-DVX200 may sound like just another camera model, but this one takes a different stance. Since it retains the integrated lens, SD card slots, and 72mm filter diameter, you may ask, "what's new?"

The AG-DVX200 has a striking crimson section of its body that denotes the recording controls. It is a section that warrants attention since it shoots 4096 x 2160 at 24 fps, 3840 x 2160 or 1920 x 1080 at 60p/50p/30p/25p/24p, and offers a 120 fps mode. The heart of this is a 4/3" large-format MOS sensor and the VariCam's characterisic "filmic tonality and colorimetry."

The Leica Dicomar f/2.8-4.5 zoom lens can be controlled by the three rings: focus, iris and zoom. So while the AG-DVX200 gets 13x zoom, it also gets subtle bokeh, 5-axis Hybrid Image Stabilizer and 4x correction-area Image Stabilizer.

The real kickers are the center of balance, which accommodates both the front heavy lens and battery at the rear, and the price tag. We don't have final word — only a statement that the AG-DVX200 won't cost more than $5,000. Due in Fall of 2015, producers can look forward to a strong fixed lens option that can record 4K video to class 3 SD cards, and that should also be a joy to operate handheld.

Introducing Blackmagic URSA, the world's first user upgradeable 4K digital film camera!

Blackmagic URSA is the world's first high end digital film camera designed to revolutionize workflow on set. Built to handle the ergonomics of large film crews as well as single person use, URSA has everything built in, including a massive 10 inch fold out on set monitor, large user upgradeable Super 35 global shutter 4K image sensor, 12G-SDI and internal dual RAW and ProRes recorders.

**Super 35 Size Sensor**
URSA is a true professional digital film camera with a 4K sensor, global shutter and an incredible 12 stops of dynamic range. The wide dynamic range blows away regular video cameras or even high end broadcast cameras, so you get dramatically better images that look like true digital film. The extra large Super 35 size allows for creative shallow depth of field shooting plus RAW and ProRes means you get incredible quality!

**Dual Recorders**
Blackmagic URSA features dual recorders so you never need to stop recording to change media. That's critical if you are shooting an historical event, important interview or where you just cannot stop shooting! Simply load an empty CFast card into the second recorder and when the current card is full, the recording will continue onto the second card, allowing you to change out the full card and keep shooting!

**User Upgradeable Sensor**
Blackmagic URSA features a modular camera turret that can be removed by unscrewing 4 simple bolts! The camera turret includes the sensor, lens mount and lens control connections and can be upgraded in the future when new types of sensors are developed. This means your next camera will be a fraction of the cost of buying a whole new camera! Choose professional PL mount, popular EF mount and more!

**Built in On Set Monitoring!**
Say goodbye to bulky on set monitors because you get a massive fold out 10 inch screen built into Blackmagic URSA, making it the world's biggest viewfinder! The screen is super bright and features an ultra wide viewing angle. URSA also includes two extra 5" touch screens on both sides of the camera showing settings such as format, frame rate, shutter angle plus scopes for checking levels, audio and focus!

Blackmagic URSA EF $4,995

Blackmagic URSA PL $5,495

www.blackmagicdesign.com
Lenses and accessories shown are not included

Blackmagicdesign

# Samsung NX1 Smart 4K Camera

by Mike Wilhelm

## A Challenger Appears

For about a year now, video shooters have been debating about the two big players in entry-level 4K video: the Sony a7S and the Panasonic GH4. Now a new contender has entered the ring. Samsung's NX1 seeks be a worthy albeit unique addition to the industry's current offerings.

The primary feature of the NX1 for video shooters is clearly the camera's internal 4K recording capabilities. By offering 4K with what's now the company's flagship camera, Samsung has publicly declared that they take seriously the needs of both enthusiast and professional video producers. The result is a camera that stands equally among the competition but is not without flaws, and which may prove too much for some to handle.

For this review we shot with three different Samsung lenses: 50-150mm f2.8, 16-50mm f3.5-5.6 and 15-55mm 3.5-5.6, along with a Kingston 64GB Class 10 SDHC card.

**Samsung**
www.samsung.com

STRENGTHS
- Internal 4K with no added sensor cropping
- Focus peaking and zebra stripes in-camera
- 120 fps in 1080
- Very manageable video file sizes

WEAKNESSES
- Cumbersome file format
- Image quality not as sharp as the competition
- Clunky audio controls
- No 10-bit out via HDMI

**$1,500**

## The Shooting Experience

Right out of the box, the NX1 feels great. Thanks to the mirrorless design, the NX1 is compact, but it doesn't feel like a consumer camera. The best word to describe the NX1 is dense. It doesn't have the hollow, plastic feel of many consumer cameras. Each button, knob and dial feels like it's purpose-built. The shooting mode dial locks in place with the press of a button, and frequently used controls like ISO, white balance, shutter and aperture all have dedicated controls in convenient places; no holding one button down while spinning a click wheel required. It even has a dedicated mobile connect button to easily send files to a mobile device for a quick post to Instagram — at least in theory. The NX1 uses the h265 encoding standard, which keeps file size very small. A high-capacity SD card will take you a long way. However, despite the small size, there are currently no smartphones that natively support h265, so sending video files from the camera directly to your smartphone and off to Instagram is currently impossible.

Thanks to a recent firmware update, it's possible to change all exposure settings while recording. However, the very handy touch interface is disabled during recording, so changing settings requires physical button presses or click wheel turns, meaning you may experience some camera shake if you attempt to make adjustments on the fly.

We are of course thankful that Samsung includes volume meters on screen while recording video, but we were disappointed to find that there is no way to adjust the microphone volume levels while recording. Adding to this, when not recording, adjusting levels means diving into the NX1's menu and choosing a whole number between one and 10 — not exactly precise control.

The LCD is tiltable, which makes high- and low-angle shooting a breeze.





TECH SPECS

**Sensor Size & Type:** CMOS, 23.5 x 15.7 mm
**Effective Megapixels:** Actual: 30.7 Megapixel, Effective: 28.2 Megapixel
**Video Format:** AVI, MP4 (h265)
**Resolution & Frame Rate:** 4096 x 2160 (24p), 3840 x 2160: (30p), 1920 x 1080 (120p, 60p, 50p, 30p, 25p, 24p), 1280 x 720 (120p, 60p, 50p, 30p, 25p, 24p), 640 x 480 (120p, 60p, 50p, 30p, 25p, 24p)
**Recording Media:** SD, SDHC, SDXC (up to 64 GB)
**Display Size and Resolution:** 3" Rear Touch Screen Tilting AMOLED (1,036,000)
**Lens Mount:** Samsung NX
**Included Lens:**
**Audio In:** 1/8" Microphone
**Audio Out:** 1/8" Headphone
**Video Out:** HDMI D (Micro)
**Other Interface:** USB 3.0
**Shutter Rage:** 30 - 1/8000 seconds in Manual Mode
**ISO Range:** 100-25600 (Extended Mode: 100-51200)
**Shot Assist:** Focus Assist Zoom, Focus Assist, Zebra Stripes, Histogram
**Battery:** 1x BP1900 Rechargeable Lithium-ion Battery Pack1860 mAh

It has pleasant sharpness and contrast, but the brightness is such that shooting outdoors, even in indirect sunlight, is difficult. While the electronic viewfinder works well when used, it's generally inconvenient for video. Users will likely have to either get accustomed to shading the LCD or use an external monitor.

Speaking of the LCD, the on-screen shot assists are quite good for a photo-first camera. It ships with zebra stripes for monitoring exposure, which is near-essential for shooting video. Unfortunately, the zebras are all or nothing. They're set to highlight 100 percent overexposure, and that's all you get. It's nice to be able to set zebras at 60-70 percent to highlight skin-tones, so it's sad that setting customization is lacking here. Like most DSLRs and MILCs, the NX1 offers a histogram for monitoring, however, it disappears as soon as you hit the record button.

Ergonomic and easy-to-use controls

Focus assist is spectacular. Not only can you set automatic 5x or 10x digital zoom for whenever you adjust the focus ring — outside of when you're recording — but you also have the option of enabling focus peaking as either white, red or green highlights. Overall, with the focus assist features enabled, you'll never have an excuse for out of focus footage.

If you choose to use the NX1's autofocus, plan for mixed-bag results. Focus speeds varied quite a bit based on the lens, with longer zoom lenses taking a bit more time. Shorter lenses were very fast and accurate. The touch autofocus works just like your smartphone — tap to focus on a location — and Samsung has even included a one-touch shot option, where tapping the screen very quickly focuses and snaps a photo. It feels great — very responsive and satisfying. When shooting video, the same touch focus feature exists and is equally fast. That makes it great for setting up a shot, but impossible to use while recording. The focus pull is far too quick and robotic feeling to be passed off as an analog, cinematic-looking focus pull. Lastly, the focus tracking is quite accurate and can be used for video in some situations.

Record 4K internally to SD cards

The NX1 has a native 1.5x crop factor, essentially making a 50mm lens act more like a 75mm. The result is tighter shots than those from the same lens on a full-frame camera. While not as nice as the Sony a7S' full frame, this is about on par with the Panasonic GH4. In fact, when shooting 4K, the NX1 pulls ahead of both cameras, as the GH4 crops the image further, to nearly 2.3x for 4K and the a7S can't record 4K internally at all — it will only output 4K via HDMI to an external recorder. The NX1 has the strengths of both in that it records internally and doesn't crop the the image beyond the native 1.5x.

On the down side, the NX1 lacks a dedicated movie mode, meaning that while stopped, the NX1's LCD shows an image edge to edge, then letterboxes as soon as the record button is pressed. It makes framing difficult. As



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full screen
print

a workaround, Samsung enables the OK button as the Pause button, allowing shooters to remain in shooting mode while paused. Pressing the record button a second time disengages shooting mode.

Shooters who have the luxury of using an external recorder like an Atomos Ninja or Shogun gain the added benefit of being able to record 8-bit 4:2:2 video. While this feature is becoming more and more commonplace, we would have liked to see full 10-bit, as that would match the GH4's current capabilities.

If you're the type of shooter that likes to fiddle with picture styles — or picture wizard, as Samsung calls it — you're in luck. The NX1 comes with several presets and gives you the option of adjusting RGB balance, saturation, sharpness, contrast and hue. That's more settings than most cameras offer. In our tests, playing with the picture wizard offered little more than consumer-grade looks. Even with everything neutralized or completely off, there was no equivalent to a flat cinema-style profile that's similar to something like Technicolor's Cinestyle for Canon cameras.

Finally, while it's easy to be distracted by the 4K capabilities, we'd be remiss if we didn't mention that the NX1 can shoot 1920 x 1080 all the way up to 120 fps. Strangely, the feature isn't included with the other video resolutions and frame rates. Rather, to access 120 fps, you need to set your video to 1920 x 1080 30 fps then choose .25x slow motion. The NX1 creates a slow motion file that you can either leave as-is or quadruple the speed back to real time in post production. Video shot in .25x slow motion turns out as glass-smooth as you'd expect, and it's a big advantage over the NX1's nearest competition, as neither the Panasonic GH4 nor the Sony a7S have this capability at 1920 x 1080.

## The Footage

At first glance, the footage coming right out of the NX1 is impressive. It has a clean and cinematic look. However, it appears that the camera does some heavy processing in order to achieve a good look by default.

When taking a closer look at full resolution, the NX1 footage seems to offer very low noise images at the cost of sharpness. It's not that the footage looks soft, and in fact, you may never notice the reduced sharpness unless comparing it to a direct competitor, but it's there. Low-light noise is minimal, we suspect due to Samsung's Adaptive Noise Reduction applied in-camera.

To test low light performance, we shot a static scene of a director's chair in front or a brick wall, lit by only a couple fluorescent office lights in a windowless room. At 1600 and lower ISO, there was hardly any noticeable noise. 3200 ISO began to show some digital artifacting, and 6400 resulted in more artifacting still. There was a surprising lack of organic, grainy-looking noise that you'd expect to see in a still photograph. While the artifacting is certainly not ideal, we still concluded that users can expect to achieve nearly noise-free footage up to 1600 ISO and noisy, but still usable footage up to 6400 ISO. The noise in beyond 6400 renders the footage unusable by most standards, which, outside the Sony a7S, is not abnormal for a camera at this price point.

As mentioned the NX1 doesn't offer a truly flat picture style. The result is footage with true and vibrant color and high contrast. However, we were happy to see that our NX1 footage, even after having gone through the transcoding process to get to h264, gave us a bit more latitude in post than expected. Examining our footage on a waveform monitor revealed that some blacks came in under 0 IRE, allowing us to recover some detail in the shadows. Don't misinterpret this as implying raw-level flexibility, but the dynamic range is a bit more than you might expect after looking at your untouched footage.

Despite the lack of an anti-aliasing filter, moire isn't really noticeable, even in tight patterns. We did experience some moire when downscaling 4K to 1080 in post, but only in preview files. Using a high quality codec seemed to eliminate the problem.

Tiltable LCD for extreme angles

## Post-production

As of the date of this writing, the video files the NX1 producers are a huge pain to work with. The h265 standard simply has not yet been adopted by Microsoft, Apple, Adobe or any of the other of the software industry leaders. That means you'll need to convert the NX1's video files to something usable; likely h264.

Fortunately, Samsung has provided a solution in their included Movie Converter software. It's easy to use, but doesn't give you many transcoding options: it's limited to three different video quality presets with their specifications undefined. Handbrake does a decent job of transcoding, but the Mac version won't do more than one file at a time — a cumbersome process to say the least. Wondershare reportedly is up to 4x faster than Movie Converter or Handbrake, but it's $60 for a perpetual license. If true, it's worth the money, because both Handbrake and Movie Converter are painfully slow. 13 GB of footage took us about three hours to transcode on a $8,000 beast of a PC.

Once converted, the workflow is about the same as working with any 4K MPEG file, but it's rough getting to that point. With any luck, by the time you read this article, h265 pains will be a non-issue, but for now, it's definitely something to consider. Since the NX1 creates h265 files that are 1/2 to 1/3 the size of their h264 counterparts, we expect h265 to eventually catch on.

## Should you buy it?

Let's get down to brass tacks. If you need a 4K-capable, interchangeable-lens camera, the NX1 is probably worth your money. As of now, this author is leaning slightly toward the NX1 over the GH4 for one primary reason: The NX1 doesn't crop your sensor when shooting in 4K and the GH4 does. Sure, the GH4 has a sharper image and an easier to use codec, but not having that added crop makes shooting on the NX1 a much more pleasurable experience.

Samsung is taking a gamble on h265, but it's a gamble we suspect they'll win. Unless another codec comes out of left field and dethrones the ubiquitous h264, h265 is surely coming. As soon as the major software companies get on board, h265 will be as easy as most other files you're used to working with. Until then, expect to spend a little more time than usual staring at a transcoding progress bar.

The NX1 marks Samsung's entry into the professional-level video, and it's not just a token entry; the NX1 is a strong contender for your dollar versus the competition. For a very affordable price, the NX1 offers a complete package of commendable image quality, a complete feature-set, 120 fps at 1080, and best of all, internal 4K.

**SUMMARY**

The Samsung NX1 provides a full-array of video features and records internal 4K. Its h265 files are small and look nice but transcoding them is cumbersome.

Mike Wilhelm is *Videomaker*'s Director of Content.

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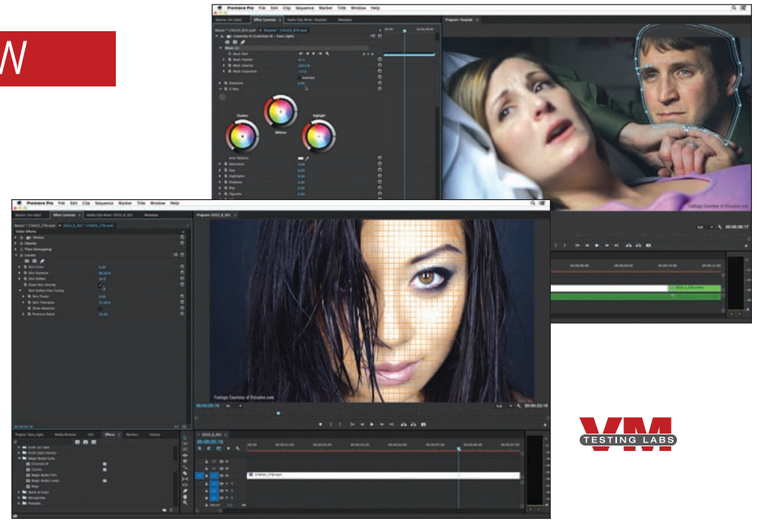
# Red Giant Magic Bullet 12



by Steve Taylor

## A Powerful Update to a Must-Have Toolset

As a video editor for the last three decades, I've certainly seen my fair share of plug-ins for color correction and grading. When I saw Magic Bullet Looks for the first time in early 2008, I knew it would change the landscape of video image processing, and it did that in spades. The bundling of other complementary tools into the Magic Bullet Suite of plug-ins just added to that must-have product for any serious editor.

**Red Giant**
www.redgiant.com

STRENGTHS
- Powerful and easy to use toolset for color correction and grading
- Fix your footage and add film-like color effects
- All GPU accelerated for fast rendering

WEAKNESSES
- Price may preclude non-professional use
- Some tools exist in multiple places
- Some tools are redundant with existing features of your NLE

**$799**

Now we have Magic Bullet Suite 12, which in the eyes of this reviewer is an absolute game-changer. Seven tools, some updated and some completely new, that re-set the standard for video image manipulation. In many ways, the "magic" in this suite of plug-ins happens behind the scenes. You don't have to know how it works, it just does. There's much more to talk about than we have space for, but let me give you a bit of insight into each one.

### Magic Bullet Looks 3

The headliner in this show is the venerable Looks now in version three. One of my biggest beefs with earlier versions of Magic Bullet Looks was the rendering speed. Well now I can use these tools freely, knowing that the software is taking full advantage of the incredible power of the AMD GPUs in our MacPro, or whatever open-GL video card you might have. In most every case, when applying an effect from this suite, the render was nearly instantaneous.

Red Giant Software has expanded Looks to now have 198 Look presets and 44 tools to correct and grade your footage. All the awesome original tools are still there, but newly added to the set are nine tools including Color Space, Colorista, Film Negative/Print, 4-way color, Mojo, DuoTone, Lens Vignette and Shadows/Highlights. We especially love the Shadows/Highlight tool as it works very similarly to Adobe Lightroom's adjustment tools. This is some of that magic that blows your mind. Seeing how simple and effective they make it without the user needing to know color science is amazing.

### Magic Bullet Colorista III

Red Giant has updated this widely-used color correction tool with simpler controls and new capabilities. In day-to-day editing, this author has used Colorista as the go-to color correction plug-in for years. This new version not only brings GPU acceleration, but new tools like the aforementioned Shadows/Highlight controls, more detailed curves editing and one of our favorite effects, the Vignette slider. We love the fact that we can use

Choose from 100+ film stocks & processes in Magic Bullet Film.





TECH SPECS

**Operating System:** Windows 7 or 8 64-bit, OS X 10.8 or later
**CPU:** Intel Pentium 4 2.4 GHz or faster, or AMD equivalent
**Required software:** Works with many host applications including Adobe After Effects, Premiere Pro, Apple Final Cut Pro X, Apple Motion, Sony Vegas Pro and Avid Media Composer.
**RAM:** 4GB
**Graphics / VRAM:** Intel HD3000 (Mac), Intel HD5000 (Windows) or better. Discrete GPU with at least 2GB VRAM recommended.
**Note:** Magic Bullet Suite is made up of several tools that each have their own compatibility info. Visit *www.redgiant.com/products/magic-bullet-suite/compatibility/* to learn more about each product's compatibility.

Adobe Premiere Pro's effects masks to apply Colorista III to parts of our image and even automatically track those masks across time.

### Magic Bullet Film

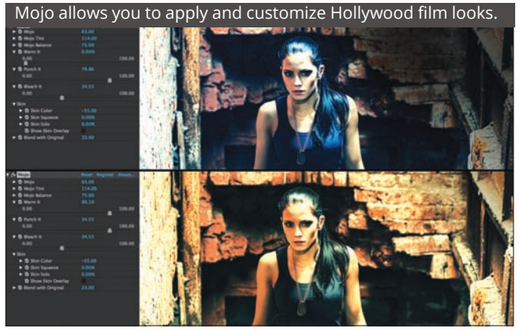
New to the Magic Bullet Suite is Magic Bullet Film. Red Giant took the time to shoot and analyze over a hundred different film stocks, processes and developing techniques, and then used that to create Magic Bullet Film. This tool gives you the look of film and includes controls for specific negative and print stocks, color temperature, grain and vignette, as well as a vintage/modern slider. Most of these same controls are also available in Magic Bullet Looks.

### Magic Bullet Mojo

Mojo provides another way to add a treatment to your footage. With presets that emulate Hollywood film looks, the software provides a fast way to apply some cool effects. One great feature is the ability to protect skin tones to keep them natural while still providing the user with some great style choices. The main revision to this tool is near real time GPU acceleration.

### Magic Bullet Cosmo

Cosmo provides the capability for the user to isolate skin tone for smoothing and balancing. It's great on interviews and stand ups where talent or clients — sometimes without so much talent — are always concerned with wrinkles and skin blemishes being accentuated on-camera. In this day of high resolution video, this becomes even more important. I have on-camera talent continually thanking me for making them look younger. I tell them it's an ancient trade secret, but really it's as easy as applying Magic Bullet Cosmo.



Mojo allows you to apply and customize Hollywood film looks.

### Denoiser II

Although unchanged in this release, new users will be blown away by how this tool can save footage that was thought unusable. When forced to shoot in situations with less than ideal light, or when footage comes back that was shot at high ISO settings, Denoiser II has the ability to remove that noise with special abilities that keep the detail intact. When we're out shooting, we love the freedom to shoot at higher ISO settings, knowing that we can easily and quickly remove noise from the footage in post.

### LUT Buddy

As editors who deal with a variety of footage types, sometimes we get footage from cameras that shoot in special color modes to preserve detail in the highlights and shadows. Natively, this footage looks very flat and requires some color conversion to bring it back to normal color space. These conversion settings come in the form of a LUT (Look Up Table) file. Certain camera manufacturers provide LUTs for their specific cameras. With LUT buddy, you download a LUT file from the internet and apply it to your footage.

### Summary

For this author, after putting Magic Bullet Suite 12 through the test of a real-world project, it didn't take long for this tool to be the go-to for any color correction or grading task I had. I have never had a plug-in become an instant must-use for every shot I lay on a timeline. The power, speed and wide variety of image manipulation tools Red Giant has provided in this incredible update give editors all they need to make beautiful and unique visuals.

**SUMMARY**

With this update to a widely-used and mature set of plug-ins, Red Giant has taken a great toolset to a new level with new features that address not only the need of editors to color correct and grade their footage, but also to take advantage of the powerful GPUs in today's computers.

Steve Taylor is Senior Creative Director at Digital Spatula, a Los Angeles-based production/post boutique specializing in motion graphics.

You can comment on this article by going online: www.videomaker.com/article/17843



contents
full screen
print

# CAME-TV CAME-7800 Gimbal

by Zac Fernandez

## DSLR Friendly Gimbal

Ever had the urge to toss all your equipment away after reviewing your footage from a long day of shooting and realizing your handheld shots look like junk? We'd never recommend tossing any of your equipment away, but we know and understand the feeling. Steady, smooth and crisp shots will most definitely decrease your stress level and increase the value of your footage. With a little help, you can capture excellent handheld shots that will boost your image quality. We're talking about gimbals, specifically, in this review, CAME-TV's CAME-7800 3-axis gimbal, which right now is at a great price of $1,298. With the CAME-7800, you can increase the value of your handheld shots, make the editing phase less stressful and save time and money, and you'll be doing so by purchasing a gimbal at a lower cost than most other gimbals on the market. So, let's take a look at the CAME-7800 3-axis gimbal.

**CAME-TV 7800**
www.came-tv.com

**STRENGTHS**
- Sophisticated design
- Lightweight
- Good price

**WEAKNESSES**
- Lots of parts
- Leveling requires patience
- Multiple tools required

**$1,300**

## Out of the Box

First off, when the CAME-7800 arrived in the box it seemed fairly large in size, and that can be very intimidating to some. We can reassure you that the size of the box is only because the added foam for protecting the gimbal during shipping and transporting. Whew! Well, that was a relief. When taking the CAME-7800 out of the box we immediately found it to be fairly lightweight, making it no problem to hold with one hand while we closed the box and set it aside. The next thing we noticed was that the gimbal was fairly loose in the brackets and posts, and there were a lot of screws that needed to be tighten. Luckily, CAME-TV was nice enough to include a set of perfectly sized allen wrenches so we didn't have to dig into our own tools. Next, the 7800 gimbal comes without a stand so we had to figure out another way to attach a camera. Lastly, the CAME-7800 has a maximum holding capacity of 6.6 lbs (3 kg) so we decided to use a Canon T5i with a 50mm prime lens to keep total weight down.

## Set-up Process

When it comes to setting up the CAME-7800, we have to warn you that it might take some extreme patience in placing a camera on the rigging and balancing it. This device is not for the quick-to-give-up type of operator, but as video professionals, we all know that patience isn't just a virtue; it's something that we must adopt during the process of becoming a videographer.

Just like we learned when taking the CAME-7800 out of the box, there are a lot of screws and brackets to tighten down in order to start leveling the camera. Leveling and balancing the camera before using the gimbal is key to the success in producing smooth footage without any issue.

With the quick release mounting plate, there are a few things to adjust.



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# CAME-TV 7800 Gimbal

TECH SPECS

**Load Capacity:** 6.6 lb (3 kg)
**PC Board:** 32-bit Alexmos board
**Battery Chemistry:** Lithium-polymer
**Battery Run Time:** Approx. 45 min.
**Camera Support: Max. Width:** 7.2" (18.4 cm), Max.
**Height:** 5.3" (13.5 cm)
**Weight:** 4.8 lb (2.2 kg)
**Camera Attachment:** Quick Release/Wedge Plate

Ideal for most DSLR and MILC shooting

First off, the wedge locking plate locks in pretty well, but you'll need to balance the camera so that it isn't tilting forward or back too much. This can be very tricky without a stand holding up the CAME-7800 because the plate slides quickly and if you only have one hand to balance the camera, you will struggle greatly.

The easiest solution may be to purchase the CAME-TV balancing stand for the 7800 gimbal ($98), or if you're crafty enough, you can rig up your own stand for a lot less. Either way, a balancing stand is the way to go. It will save you a bunch of time. The last thing to adjust is the side-to-side tilt. Underneath the mounting plate and on the rigging there are two bolts you need to adjust until the camera isn't leaning one way or the other. Gently slide the camera side to side until it is squared then carefully tighten the plate down and — bam — you should have a balanced camera.

Leveling and balancing takes a good amount of time, but with good patience and a steady hand or two you'll be ready to roll.

## Out in the Field

For testing purposes, we used the CAME-7800 in real time at a wedding, and when it comes to weddings and other similar paid gigs, you want the best footage possible. Using the CAME-7800 would be great if you wanted to capture some very smooth hand held shots, like when the bride is walking down the aisle to the groom or during their first dance and during the bouquet toss. These types of shots require steady hand and great precision, but with the CAME-7800, you'll have almost no shakiness whatsoever.

All in all, the CAME-7800 held up in the field. We do recommend that you purchase an extra Lipo battery, and if you want use the 7800 throughout an entire event, we also recommend something like the 2-Rod support system by Atlas Camera Support. It could help relieve the strain on your neck and back from holding the CAME-7800 with a camera and LCD monitor all day. It could also help in capturing the smooth and steady footage necessary for increasing the value of your project.

## Overall Experience

Okay, so setting up the CAME-TV CAME-7800 was a bit of a pain since there are a lot of moving parts to tighten down. The mounting plates are also not the easiest things to work with, but really there are worse things that we've had to deal with — like junky handheld footage from when we didn't use a gimbal like the CAME-7800. Once we were able to level and lock in the camera, we were off running, figuratively and literally, with the CAME-7800. We genuinely had a fun time using this gimbal, and after importing and reviewing our footage, we can easily say that the 7800 helped improve the sometimes jumpy and jolty footage that we shoot when we're not using a gimbal. The shots were so smooth that it seemed flight-like in nature, as if the camera was sitting on a low flying drone, one which could hold a DSLR camera, microphone and an LCD screen. The CAME-7800 is a solid product for a solid price, and we can easily recommend it to the user who really wants a low cost gimbal to increase the value of his or her footage.

SUMMARY

For flight-like movements, the CAME-TV CAME-7800 3-axis gimbal is a great device that will assist you in capturing some smooth and steady handheld shots. Greatly increasing the value of your footage without greatly decreasing the value of your savings account, the CAME-7800 will help you shoot the hand-held footage that you've always hoped to capture.

Zac Fernandez is a freelance videographer and an international documentary filmmaker.

You can comment on this article by going online: www.videomaker.com/article/17844

# NEC PA322UHD Monitor

by Jason Miller

## Color Criticality

4K is here in a big way. Professional cameras capable of shooting high quality 4K footage have come down in price dramatically. The Panisonic GH4 will only set you back about $1500, or you can head to your local electronics store or big box mart and pick up a GoPro capable of shooting excellent 4K material for only $500. But without a 4K display with which to view your beautiful footage, what good is the 4K camera, other the the ability to resize in post?

There are a plethora of 4K displays on the market, with new products being released all the time. However, there is tremendous discrepancy in image and build quality. If you want a display for more than just gawking at your GoPro footage, you'll need a professional monitor, and if you plan on doing any color grading, serious visual effects work or editing, you need color accuracy. The NEC Multisync PA322UHD is one of the best examples of what is available.

The NEC Multisync PA322UHD is as beautiful as it is pricey. This 45-pound, 32-inch display will set you back about $3000, which, unless you're a colorist, VFX artist or editor doing high-end work, may be outside your budget. Despite the hefty price tag, this monitor delivers.

## Out of the Box

The first thing you will notice when setting this beast up is its sheer mass. Not only is it one of the heaviest displays on the market, it is also very thick at about four inches without the stand. This 32-inch display will dwarf most desks and demands a lot of desktop real estate. The hardest part of setting up the monitor is getting it out of the box and onto the desk — a process that is recommended for two people. Once the display has found a comfortable location, hooking it up is easy. We tested it with a Macbook Pro, hooking it up with the provided Mini DisplayPort to HDMI cable. Once plugged in, the Macbook detected the display and worked flawlessly.

The beautiful 32-inch Indium Gallium Zinc Oxide (IGZO) panel is equipped with a non reflective and anti-glare coating. Near the bottom right corner or the monitor you'll find the menu, power, input select, left/right rockers and picture in

NEC
www.necdisplay.com

STRENGTHS
- Beautiful, color-accurate display
- Easy to connect to source and navigate menu
- Built-in 14-bit 3D LUT
- Four-year warranty

WEAKNESSES
- Massive; requires two people to lift or move
- Requires large, dedicated desk space
- Refresh rate reduced to 30Hz when using DisplayPort signal

**$3,000**

TECH SPECS

**Display Type:** IGZO technology IPS type LCD
**View Size (diagonal):** 32"
**Resolution:** 3840 x 2160
**Contrast Ratio:** 1000:1
**Input:** 1 x DisplayPort, 1 x DisplayPort OPS,
4 x HDMI, 2 x DVI-D Dual Link,
USB 3.0 hub, 2 x up / 3 x down with DisplaySync Pro
**Output:** DisplayPort, HDMI
**Brightness:** 350 cd/m²
**Frequency:** 120Hz in full HD mode, but is limited to 60Hz in UHD
**Aspect Ratio:** 16:9
**Stand/Mount:** tilt, swivel
**Colors Supported:** 1.07 billion

picture buttons for easy navigation of the simple menu. The display comes with a extensive array of input and output options including four HDMI inputs, a DisplayPort, two DVI inputs, two upstream USB 3.0, two downstream USB 3.0 and a headphone jack. The display operates with a refresh rate of 120Hz in HD (1,920 x 1,080) but is cut down to 60Hz in UHD (3840 x 2160). When using a DisplayPort signal (UHD via HDMI) the refresh is reduced even further to 30Hz.

## Performance

It cannot be said enough: This monitor is beautiful. The colors cover 99.2% of the Adobe RGB color spectrum, and built into the monitor is a 14-bit 3D lookup table (LUT) which will get the monitor to near perfect calibrations. While the monitor worked beautifully right out of the box, you can purchase the SpectraViewII Color Calibration Kit ($299) for increased color performance. However, the image representation out of the box is awesome in the most literal sense of the word.

On top of the usual brightness/contrast, sharpness and color temperature adjustments, the PA322UHD allows the user to adjust numerous other picture settings such as individually adjust the hue, saturation and offset for Red, Green, Blue, Cyan, Magenta and Yellow (RGB CMY). Included are picture presets for sRGB, Adobe RGB, Full, High Bright and Digital Cinema (DCI).

Using the monitor with Adobe Premiere, After Effects, Photoshop, and Resolve worked flawlessly, reproducing excellent blacks, greys and highlights. The image was vivid while not glossy due to the matted screen. The colors were bright but not over saturated. The viewing angle was near 180 degrees so there are virtually no bad angles, even without the sturdy stand to allow the gargantuan monitor to swivel and tilt with ease.

Due to the UHD (3840 x 2160) resolution there is a serious increase in screen real estate over traditional monitors. Not only can the PA322UHD easily replace two traditional HD monitors, it is a lot more convenient. Using this with After Effects was a joy; there was more than enough screen to expand an impressive number of layers, have several windows open as well as many effects and script panels. The same can be said for working in Premiere Pro, which again was a real pleasure with the monitor. The refresh rate seemed to keep up with our quick graphical animations in After Effects as well action shots in Premiere with no ghosting for delays. In Photoshop, high resolution images came to life, looking sharp, clear and realistic.

Easy-to-access controls for adjusting display settings

## Weighing the Costs

While this display is a dream to use, there are serious costs to the NEC Multisync PA322UHD, both in its hefty price tag but also its size. The monitor will take up the majority of even a decent sized desk. Dropping $3000 on a monitor can be a hard task, even for high-end professionals who, in this competitive market, have to find as many ways to save money as possible. However, if you can fork over the dough, this display is well worth it. NEC backs this monitor with an impressive four year warranty with Advanced Exchange, so even though you may spend a crazy sum of money on it, the display should last for years to come.

SUMMARY

The NEC PA322UHD is a high-end, professional, color-accurate display that reproduces some of the best images on the market. With superior image quality that is reflected in its price, this display is clearly geared toward high-end colorists, editors and VFX artists.

Jason Miller is a professional filmmaker, editor and visual effects artist whose work has been seen in feature films and national marketing campaigns.

You can comment on this article by going online: www.videomaker.com/article/17845

# VSN Mobil V.360 360° Action Camera

by Jason Miller

## Immersed in the Action

Many in the industry believe that immersive cinema and gaming are the future of entertainment. This includes Facebook, who recently shelled out two billion dollars to buy the virtual reality start up Oculus Rift. The Sundance Film Festival's New Frontiers section this year featured, among other things, 11 virtual reality projects. We are on the precipice of a dramatic shift in entertainment, and the time is ripe for a product to take advantage of this trend towards immersive content. VSN Mobil is one of the first contenders to throw their 360 degree hat into the ring with the V.360, claimed to be the only camera to shoot a true HD 360 video. Their hope is that this new camera will prove to be more than just a novel toy.

## An Unusual Design

Beyond the 360 degree image, the most striking aspect of the camera is its shape, which is more like a coffee grinder than an action sports camera. The camera body is a 4-inch by 2.2-inch cylinder, the lower half of which houses the internal 2,610mAh battery, MicroSD card slot, Micro USB 3.0 and HDMI port and a tripod mount, a very welcome addition often missing on other action sports cameras. The upper half of the cylinder is clear plastic that protects the camera apparatus — a reflective cone with the actual camera inside its tip pointing up toward a small mirror at the bottom of an inverted cone attached to the top. While this makes for the strangest looking camera on the market, it provides the capability to create an unstitched 360 degree image, unlike other 360 degree and panoramic cameras. Weighing in at 8.82 ounces, the camera is larger than a GoPro, but it feels light for its size. The flat bottom of the cylinder is perfect for setting the camera on the ground to catch a skateboard kick flip or a car flying by. The top of the camera features a bubble level, which can be used when mounting on a tripod or other kind of stand. The V.360's size and weight would be a slight inconvenience when mounting on a helmet or body, though. A nice feature of the camera is that it is compatible with the plethora of GoPro mounting hardware. The V.360 comes with a Bluetooth remote for turning the camera on and off, taking pictures and hitting record. The remote is rubber encased cylinder about the size of a roll of nickels.

## Performance and Usability

The V.360 is very much a one trick pony, though that trick is utilized in

VSN Mobil
www.vsnmobil.com

STRENGTHS
- Unstitched 360 degree image
- Waterproof up to 3 ft. and 30 min.

WEAKNESSES
- Outer plastic easily smudged
- Limited manual controls

**$449**

# VSN Mobil V.360

**TECH SPECS**

**Format:** h.264 MP4
**Size of Sensor:** 1/2.3-inch sensor
**Pixels on Sensor:** 16MP
**Maximum Resolution:** 6480 x 1080p
**Focus:** Auto
**Shutter Speed:** Auto
**Viewfinder:** None included
**Frame Rates:** 24, 30
**Video Out:** HDMI
**Mono/Stereo Recording:** Stereo
**Audio Input(s):** None
**Wireless Remote:** Yes
**Battery Type:** 2,610mAh
**Onboard Video Light:** No

about every way imaginable. On top of being able to capture true 360 degree video, you can take panoramic pictures which can then be Geo Tagged and uploaded to Google Photosphere, and there is also a cool time-lapse feature.

The 16 megapixel 1/2.3-inch sensor records video at a resolution up to 6480 x 1080 with a field of view of 360 x 60 degrees at up to 30 frames per second. It's powered by an impressive 2.3 GHZ Qualcomm Snapdragon quadcore processor found in many smart phones.

Topped with convenient bubble level

This is VSN Mobil's first take on a 360 degree camera and the image quality reflects that. The video looks like it came from a cellphone: very grainy, poorly compressed with the occasional digital artifacting and color imperfections. This is all exemplified in low light. When the lights start to go down the image becomes very noisy and unusable — again think cell phone video. While this camera won't be used in a professional capacity, it's still really fun camera to strap to your surfboard, mountain bike or race car. Being able to horizontally pan your shot 360 degrees in post is unbelievably cool.

VSN Mobil claims that the camera body is built to military grade durability specs, though the camera feels fragile and light. The clear plastic that encases the camera seems to scuff very easily and those scuff marks as well as any fingerprints get picked up. It feels as if one crash will destroy the unit, though a crash test was never performed by this author. The camera is waterproof up to three feet of water for thirty minutes without the need to buy any additional housing or hardware. There is a rubber seal on the bottom access door that makes it very difficult to open but protects the electronics from water damage.

The camera has the ability to record stereo audio with two pinhole mics on the lower half of the body. Like all other action sports cameras, this is not usable audio in any professional sense but will capture your agonizing screams when you crash your snowboard on that half pipe with the added bonus of being able to pan the shot to see your body as it bounces away.

There are no buttons or displays on the camera, only a red/blue indicator light. The entire interaction with the unit is done with the provided Bluetooth remote or with your smartphone/tablet using the free app.

The app is something the team at VSN got right, but it is not without its problems. The UI is simple and easy to use. Just connect your phone via WiFi or Bluetooth to the camera for complete control. Using the app, the camera can be switched from video to picture to time-lapse. While there is no exposure control, white balance can be adjusted using a couple basic presets. The app also allows you to live-view what you are shooting, though there is up to a three second delay. Communication between the smartphone and the camera is not consistent. You can also playback clips and well as edit and export them for upload.

## Bottom Line

The V.360 is priced at $449, which for a camera that is not ready for professional use and only has niche appeal seems a bit high. With future models, we hope the camera's image will improve in such a way that it may be used in a professional setting. The image quality in bright vivid daylight is good, but as soon as it gets darker the image suffers dramatically. The form factor is awkward and you really have to check the protective plastic that covers the camera as every fingerprint and imperfection shows up. The app's user interface is simple and easy to use but lacks some basic functions, such as exposure control, and suffers from a serious delay in live-view. All in all, this camera is fun to use and will likely find an audience in the extreme sports world.

**SUMMARY**

The V.360, VSN Mobil's 360 degree camera, is a really exciting and fun toy, ideal for strapping to a surfboard, race car or any other extreme sporting vehicle. However, subpar image quality and lack of basic controls keep this camera in the consumer market.

Jason Miller is a professional filmmaker, editor and visual effects artist whose work has been seen in feature films and national marketing campaigns.

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# ACTION CAM ACCESSORIES BUYER'S GUIDE

BY W.H. BOURNE

Thinking about buying an action camera but not sure what accessories you'll need? Maybe you already own you action camera, and you're looking to see what accessories are available? Well, we're here to help.

The shots you get with your camera are dependent on where you place your camera. This is true from huge IMAX cameras down to tiny action cameras. The big difference between the two is that action cameras are small enough and light enough to mount almost anywhere.

Availability of accessories may influence your sports camera purchase since many action cameras have proprietary accessories; however, if you've already purchased your action camera, you may be looking for accessory ideas for the sport you'd like to capture. Having the proper accessories makes all the difference in trying to capture that great ski video or your underwater exploration. We'll look at the vast array of products from some of the leading manufacturers in action camera accessories so you can find just what you need for your next video adventure without breaking your budget!

## Bundles can help you find what you need.

If you haven't bought your camera yet, you may want to consider purchasing a bundle. Many camera manufacturers offer bundles that will include essential accessories you'll need to start shooting. Some even provide bundles customized to your specific activity. Even if you already have your camera, the bundles can show you the types of accessories available for the shooting you plan to do.

GoPro has created bundles specifically customized for 21 different types of activities. The items in the bundles can be purchased separately if you already own a GoPro. Not all of the accessories work with all models of GoPro's cameras so check to make sure your model is supported. GoPro's current bundles include the HERO4 Black camera which has a base price of $499; with accessories added, the full cost can be upwards of $1,000.

Sony and Monoprice have starter bundles for several of their action cameras that include various items ranging from mounts to waterproof housing to live remotes to a chest harness. Sony even sells an action camera bundle designed to train you to be a better golfer. All of the bundled items can also be bought individually, although the starter bundles will save you money by allowing you to purchase the items together.

Vivitar has their 787HD action camera that retails for $100 and comes with the waterproof housing, remote control, and mounts for bikes and helmets. While it's not a 4K GoPro, the cost is around the price you might pay for just the accessories alone. ▶▶





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## Proprietary Accessories

Since GoPro has the largest market share of action cameras, they also tend to have the largest assortment of accessories produced by a variety of companies. This is bad news for other action cameras because GoPro has a proprietary mount. It's important to note that all official GoPro accessories are proprietary for their cameras. When purchasing GoPro accessories, you'll also want to make note of your model of GoPro since many of their accessories are camera-specific.

In general, you should check the specs of your camera before you purchase any accessories. If you camera has 1/4"-20 mount abilities then you'll have much more flexibility when purchasing accessories from a company other than your camera's manufacturer. Some companies do sell adapters so you can use their cameras with universal mounts or other camera manufacturer accessories.

**The following adapters are important to note:**

Monoprice's MHD Sport T-Tip Mount Compatible with GoPro Mounting Accessories retails for $2.94 and allows you to use Monoprice's MHD Sport Wi-Fi Action Camera with many of the accessory mounts designed for GoPro.

Poloroid's Cube Tripod Mount retails for $18 and allows you to mount the Cube to any tripod and most 1/4"-20 mounted accessories.

GoPro has a Tripod Mount that retails for $9.99 that is 1/4"-20 threaded if you wanted to use it on other universal mounting accessories.

## Protective Housing

A water-resistant camera is not a waterproof camera. Some action cameras aren't even water-resistant. If your camera will be around water, you'll definitely want a waterproof housing. An important factor to examine when considering waterproof housings is how deep under the water can it go. Most companies' waterproof housings are rated to 196' (or 60 meters) but some are only rated to 30'. Protective housing made by your action camera's manufacturer will usually provide a better fit particularly for underwater usage. A majority of the underwater housing is proprietary for specific action cameras, like the action camera housings for GoPro, Sony, Contour, Monoprice, Vivitar, and Polaroid's Cube.

Underwater housings offer great protection from sand; they also provides an added protection against impact. Impact resistance is another element to consider when deciding on a protective casing, especially when using your camera for high velocity sports or aerial drone use.

Many of the underwater housings provide a 1/4"-20 threading on the bottom of the case that will allow your proprietary mounted camera to accept a universal mount, which is important for tripod use in addition to allowing the use of universal accessories.

## 3D Housing

Designed exclusively for the Hero 3+ Black edition, GoPro's 3D housing allows you to shoot dual 2D footage that can be easily converted to 3D with the free GoPro Studio editing software. Retailing at $200, the tandem housing holds two cameras and is waterproof up to 197'.

## Filters

GoPro has red and magenta dive filters retailing at $70 each. Note that filters are specific to the housings they will be mounted on.

## Mounts and Support

By adapting to 1/4"-20 threading, your action camera will work with most tripods, monopods and shoulder rigs designed for larger cameras. Most action cameras are even small enough to be mounted to light stands that have 1/4"-20 hardware. Keep in mind that some fluid heads and stabilizers have a minimum camera weight needed in order to perform properly.

For many action shots, you're probably going to want camera support made for action cameras: smaller, lighter weight and often waterproof. Joby offers small bendable tripods called GorillaPods starting at just $20. Purchase a GorillaPod with Cinetics' CineSkate System ($300), and you'll have an action cam dolly setup.

Keep in mind that not all action cameras are the same shape and size. Sony's action cameras are shaped very differently than GoPro's. You might be able to use the same 1/4"-20 suction cup car mount for either brand of camera, but the same 1/4"-20 helmet side mount probably will not work for both.

While there are a huge number of off-brand action camera accessories on the market, the quality can vary greatly. Even the same make and model mount can vary greatly in quality from one piece to the next. Considering the relatively low costs of most action camera accessories, it may be worth spending a few bucks more to get a name brand that you know and trust.

## Head and Hat Mounts

There are a huge variety of head and hat mounts for action cameras; many cameras even include one with your initial purchase. Keep in mind that depending upon the activity, people can move their heads around rapidly, which doesn't always make for the best footage. Depending on the brand of your camera, prices for the mounts start at around $10.

## Helmet Mounts

There are possibly more helmet mount options for than any other type of mount. Mounting options include side, top, front or back of your helmet; mounts are also designed for various types of helmets such as smooth surfaced or vented helmets. Sony even makes a mount for football helmets.

Many action cameras include one helmet mount with your purchase. Prices start at about $10 for a simple mount and increase based on the complexity of the mount. While your shots can suffer from excessive head movement, you can decrease this by using a heavy helmet; heavier helmets tend to reduce head movement.

## Chest Mounts

Chest mounts are a great option if you're looking to decrease the amount of camera shake that you sometimes get from helmet or head mounts. Chest mounts can also give you that great POV look of seeing the wearer's arms in action, especially while skiing. Camera manufacturers including GoPro, Contour, and Sony make chest mounts for their action cameras with prices starting at $15.

## Wrist Mounts

Wrist mounts have always been favored by divers but are becoming more popular with other users; if not diving, wrist mounts are best used with the camera facing the wearer. Pricing tends to start at $15.

## Mask Mounts

While there are a few mounts designed to attach a camera to the side of a scuba or ski mask, they can be awkward for the wearer. Liquid Image has solved this problem by building action cameras into their goggle-styled mask— also a great option if you don't want your camera to be easily noticeable.

## Suction Mounts

There are suction mounts designed for use with surfboards, snowboards, skateboards, boats and cars, but they can mount to nearly any smooth, flat surface. GoPro makes a vehicle suction mount that they say is tested at speeds over 150 mph. Prices for suction mounts usually range between $18 - $80, but Cinetics offers a complete suction mount system, including three CineSquid suction mounts, a SkatePlate with Ballhead and a GorrillaPod Focus with Ballhead X for $300.

## Clamp Mount

Retailing at $50, GoPro's Jaws Flex Clamp mount allows you to attach your camera directly to the clamp or use the provided flexible neck to achieve a wider range of camera angles. ▶▶







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# ACTION CAM ACCESSORIES

## Bicycle/Motorcycle Mounts

These are mounts that are usually a two piece design that screws together around the handlebars of your bike. Many camera purchases include a bicycle mount. These mounts tend to start at $10. Regardless of the mount, you need to keep in mind that road quality will affect how much the camera shakes and will ultimately affect your footage.

## Hunting Mounts

GoPro and Contour both make mounts to attach your camera to your guns, bows or fishing poles. Prices range from $30 - $70.

## Music Mount

With musicians in mind, GoPro's mic stand mount retails for $15 and has an adapter so it will work with both US and European mic stands.

## Mount for All Seasons

GoPole's Scenelapse 360° Time Lapse Device is perhaps one of the most interesting accessories out on the market. Scenelapse will automatically rotate 360° while also allowing you to set the duration and the angle for your shots. Retailing for $35, Scenelapse comes with a removable GoPro mount but also has a universal 1/4"-20 mounting option.

## Mini Monopods and Grips

Mini monopods, also known as selfie sticks, are becoming very popular because of the unique ways you can include yourself in the action footage. In many cases, a camera's remote can attach to the pole of the selfie stick right above the grip, making it easy to start and stop recording.

GoPro's 3-Way mount is a unique design that can function as a grip, extender or tripod and retails for $70. Rugged grips like GoPole's Bobber ($30) can give similar camera angles but are more durable. The Bobber even floats if you drop it and your camera in the water.

GoPole Bobber Grip

GRIPS

## GO WILD WITH ACTION CAMERA ACCESSORIES FOR YOUR PET

Why should humans have all the fun? Now you can see, first hand, the fun and mischief that your pet experiences from their perspective by using a pet harness and your action camera. Here's a quick breakdown of pet harnesses and what cameras they will fit.

Retailing for $45, Sony has a dog harness that is proprietary and will fit most of their action cameras inside of the water and impact resistant housing. It will fit dogs with waist sizes of 19 ¾" - 31 ½". Typically this would be a dog that weighs greater than 33 lbs.

GoPro has a dog harness, Fetch, that will accommodate all size dogs ranging from 15 – 120 lbs. It retails for $60 and is compatible with all GoPro models.

Obviously, you'll also want to use a remote to monitor Fido's shots and get the most from his cinematic adventure

# STABILIZER ARMS

Steadicam Curve Stabilizer

## Stabilizer Arms

Steadicam's Curve is a compact, gimbal-based, handheld stabilizer that retails for $60. Known best for their stabilizing technology, Steadicam specifically designed the Curve for GoPro to help shooters create smooth, shake-free footage. This stabilizer is great if you have small hands or if you need a Steadicam in a small confined space.

The Smoothee, also by Steadicam, is a larger stabilizing device that has multiple mounting options including GoPro and iPhones. More than twice the price of the Curve, the Smoothee is also significantly larger. This is great for those with larger hands.

## Remote Controls

GoPro's Smart Remote (HERO3 and later) and their WiFi Bacpac and Remote Kit (original HERO to HERO2) both provide incredible flexibility for your GoPro. Retailing at just $80, either remote will allow you to control your GoPro at distances up to 600' as well as control up to 50 GoPros at once. The remotes are also wearable and waterproof.

Sony offers their wearable Live View Remote, which is both impact resistant and waterproof. The remote retails for $150 and allows you to watch the live video feed from Sony action cameras as well as control them.

The Monoprice MHD Sport and Vivtar 787HD action cameras both include remotes with your camera purchase, but these remotes are limited to controlling recording.

Many action cameras have mobile apps that allow you to control the camera and monitor the video it's shooting from a phone or tablet. Typically, the camera apps are a free download.

## Before You Buy

Double check the accessory and make sure the mount is compatible with your camera. In order to get great action camera footage, you'll need accessories work properly with your camera.

W. H. Bourne is an award-winning director; her most recent film played at more than 40 film festivals.

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# NEW LENSES

## BUYER'S GUIDE

BY MARSHAL ROSENTHAL

Creativity thrives when the videographer has the right tools at his or her disposal. At the heart of this is knowing which optical properties to look for in the lenses that will capture that creative vision.

Technology never stands still, but the optical lens industry seems to move exceedingly slow in comparison to that of other areas of video equipment. Lenses are planned and executed using computers, but at their heart they remain extremely precise pieces of glass with specific properties dictated by physics. This might seem frustrating to someone looking for the "latest" lens, but the fact remains that new lenses come out on an infrequent basis — that which was touted as being "new" in 2012 can still be thought of as fresh today. While the number of companies producing lenses has shrunk over the years, there are still many types available for purchase.

The lenses available for DSLR and mirrorless interchangeable-lens cameras (MILCs) are now called on to shoot video as well, and in many cases varying levels of high definition or ultra high definition video at that.

In addition, lenses require specific mounts in order to attach to a cameras. Some lens manufacturers make lenses that attach to a variety of cameras through the use of specialized mounts. However, many camera manufacturers make lenses that only mount to that brand of camera.

Full-frame refers to a DSLR or MILC that is equipped with a 35mm format image sensor. Compared to this, most digital cameras utilize smaller sensors because they're less expensive and easier to produce. Full-frame sensors enable wide angle lenses to reach a view equivalent to SLR lenses. Smaller sensor wide angle lenses are less wide in their angle of view. Full-frame lenses are also less noisy and so are able to attain a greater dynamic range.

While it is not possible to mention every lens of note, we will try to highlight those lenses from companies that continue to attract the attention and fulfill the needs of the videographer. ▶▶




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# NEW LENSES BUYER'S GUIDE

## Canon

Retailing at about $1,200, the EF 24-105mm f/4L IS USM AF can be considered Canon's all-purpose lens, covering a zoom area ranging from a very respectable wide angle to a portrait-length telephoto. It provides auto as well as manual focus, image stabilization technology working against camera shake up to three stops and lens construction designed to minimize chromatic aberration and distortions, effective at even wide apertures. It has both dust and moisture-resistant capabilities.

For those looking for extreme wide or fisheye use, the EF 8-15mm f/4L USM provides a 180 diagonal angle of view for all EOS DSLR cameras with imaging formats ranging from full-frame to APS-C, plus a 180 degree circular fisheye image for full-frame EOS models. Lens design suppresses chromatic aberration, and coatings reduce ghosting and minimize the effects of soiling, smears and fingerprints on the lens. A rear gel holder can accept up to three pre-cut gel filters. It retails for approximately $1,350.

## Nikon

Those looking for a near do-all lens will find solace in the AF-S NIKKOR 80-400mm f.4.5-5.6G ED VR Telephoto lens. Relatively compact for such a broad range, internal focus keeps the lens from extending outward and the front lens elements don't rotate, either. The lens features three focus modes, including manual focus, and the motor provides a quiet operation, which is vital when shooting video. Vibration reduction and image stabilization are also built in. The lens costs about $2,700.

Also presented — as a blast to the past — is the 58mm f/1.4G lens, returning to cameras a lens discontinued in 1998. The lens features a special Nano Crystal Coating and Nikon's Super Integrated Coating so as to facilitate exceptional edge-to-edge sharpness and an even lighting at all apertures. This lens fits all FX and DX cameras and retails for about $1,700.

## Rokinon

Rokinon has a series of wide angle lenses, including the second-generation 8mm /f2.8 UMC Fish-Eye II lens. It is designed for mirrorless cameras and includes a petal-shaped built-in lens hood to deflect light and protect the front element from exposure. The lens provides a 180 degree angle of view and is equivalent to a 12mm focal length in the 35mm format. It has a retail price of about $400.

The 10mm f.2.8 ED AS NCS CS is presented for mirrorless and DSLR APS-C mounts. The 35mm equivalent focal length is 12mm on APS-C format cameras, 16mm on Canon APS-C cameras and 20mm on Micro Four Thirds cameras. An anti-reflection coating system improves light transmission and reduces the reflections causing ghosting and flare. The Nikon Mount version provides automatic exposure capabilities. Retail is approximately $400.

The 12mm f/2.0 NCS CS model is for mirrorless cameras only and, unlike the other two, can accept front filters. It also has an anti-reflection coating and retails for about $400.

## Schneider Optics

Schneider Optics recently introduced lenses well suited for digital cinematography to be used with DSLRs. The Schneider Kreuznach Xenon FF Prime Lenses series includes 25mm, 35mm, 50mm, 75mm and 100mm focal lengths, plus an 18mm slated for 2015. Built for full frame use and able to handle 4K resolutions, these lenses have been designed to be compatible with industry-standard cine-style accessories such as follow-focus rigs and matte boxes. Functionality includes a circular 14-blade aperture, 300-degree barrel rotation for manual focus and color-matching consistency between lenses. Retail prices for the lenses fall in the $4,000-$5,600 range.

Also available is a 28mm lens designed for full frame DSLRs and which provides tilt/shift capabilities. Befitting its specialty moniker, the cost is more than $8,000.

## Sigma

Sigma has done a redesign of their classic focal length 50mm f/1.4 Art, adding a significant increase in glass elements. It has a new autofocus motor, nine bladed aperture and a multi-layer coating for reducing ghosting and lens flare. The retail price is around $950.

Also available is Sigma's 18-300mm f/3.5-6.3 DC Macro OS HSM Contemporary; this ultrazoom is good for those traveling or who don't want to be constantly changing lenses. It's made for mid-to-lower range DSLRs and retails for around $579.

## Sony

The Sony Alpha E-mount 20mm f/2.8 Prime and the 18-200 f/3.5-6.3 PZ OSS lenses are both produced for use with the NEX series of digital mirrorless cameras. The 20mm, joining a 16mm, has a 35mm focal length equivalent of 30mm and focuses as close as 7.8-inch. It has a seven-blade circular curvature aiding in producing out-of-focus areas when shooting with a shallow focus. It is driven by an internal stepping motor for both the autofocus drive and aperture, resulting in a smooth motion

SCHNEIDER OPTICS

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# NEW LENSES BUYER'S GUIDE

when shooting video. Manual focus is also available. The lens retails for about $350.

The 11X zoom capabilities of the 18-200mm have been optimized for shooting video. Image stabilization provides up to four stops of shake control. Both manual and autofocus options are featured, as well as the ability to shoot video with constant speed zooming through the use of the variable speed zoom control. Internal motors have been designed so as to avoid creating sound that would interfere with audio being recorded. It retails for about $1,200.

### Tokina

Tokina's ATX 11-16mm T.3 Cine lens is designed for use by independent filmmakers working with Micro Four Thirds cameras. Heavier than the non-Cine version, it sports a f/2.8 aperture and has screw holes in the zoom/focus rings for adding operator levers. Retail is around $1,900.

### Zeiss

Zeiss' Loxia lenses are designed specifically for the Sony a7 camera and work in a mirrorless, full-frame capacity. Precise manual focusing is enhanced via a large rotation angle. There is also a De-Click feature intended for smooth adjustments of the aperture while shooting video. The lens family consists of the 2/35 (35mm) and 2/50 (50mm), with prices of $1,300 and $949, respectively. Also available, and touted by Zeiss as the "best short tele lens in the world" is the Otus 1.4/85. Designed with an extremely large aperture for isolating subjects from the background, the Otus has an optical correction value for eliminating almost every form of visual aberration. It retails for about $4,500.

### To the Future and Beyond

Lens manufacturers continue to refine existing lenses — often a model will receive an upgrade in the form of an enhanced and superior replacement for an existing focal length. Lenses that are well suited for 4K video and full-frame DSLRs and MILCs are also being produced and will no doubt proliferate as new techniques strive to enhance the visual acuity of the glass. The lens industry may grind exceedingly slowly, but the results have been, and will continue to be, worth it for those looking to expand their vision through the creativity of a lens.

Marshal M. Rosenthal is a technology and consumer electronics freelance writer based on the West Coast.

You can comment on this article by going online: www.videomaker.com/article/17833

## RENTING LENSES

Renting a lens can be a cost-effective method far superior to making a purchase, especially in the case where the lens is a specialty item that is not expected to experience heavy or frequent use. Lens rental houses expect to make a profit, but the cost to you is far less than purchasing a lens outright. However, much as in a car rental, expect to be able to show identification and provide a deposit. This will most likely mean using a credit card, but there might be exceptions. It is also important to plan ahead as far as possible regarding your rental needs — the most local rental facility to your location might have the lens you need in a heavy rotation, or not have the lens at all. Since lens rental pricing is based on days, figuring in exactly how many days the lens will be needed is a necessity. However one shouldn't be influenced by the cost alone, since there is always the likelihood that the shooting will go over the time allotted. Additionally, and depending on the retail insurance cost of the lens, purchasing insurance against a mishap could also be smart. These are all things that need to be figured out prior to the actual rental.

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# HOW TO USE A LIVE SWITCHER

BY JR STRICKLAND

Ten years ago, when working in television, every week I would be handed multiple tapes of an event recorded on multiple cameras. I would spend hours uploading the tapes and syncing the footage before editing could even begin, teaching me the important benefits of using a live switcher.

With a live switcher, your post-production time is greatly reduced. Let's say your program was a half-an-hour long with three cameras, and each camera used multiple tapes or, more likely these days, multiple SD cards. You would have to first upload the footage to the computer. Then you would have to sync every time there was a cut or a new tape. After that, you will have to edit every switch.

All of this time adds up, but a live switcher will save you the majority of the work, if you know how to use one. All of this is just to re-create the live look anyway: Why not do it live? With live switching, once you shoot you're done. You can export your live service immediately for DVD, or better yet, stream live over the internet.

## Basic Controls

### PROGRAM BUS AND PREVIEW BUS

The main video source that goes out to the audience and the recorder is the program bus. Whatever button is lit should be the video source that appears on the program screen. What you see on this screen is what the audience is seeing.

The preview bus allows you to choose which shot will show up on the program bus next. On the preview bus, you can cue up your shot, load the graphics and titles and frame the shot exactly how you want before you send out live.

Using any of the transition buttons described below flips the selections of the preview and program buttons. For example, if camera one is selected on the program bus, and camera two is selected on the preview bus, transitioning will move camera two to the program bus and camera one to the preview bus.

### TAKE BUTTON

The take button toggles between preview and program. It's a direct cut to the next shot.

### T-BAR

The t-bar is the lever that transitions from preview to program. While the take button is a direct cut, the t-bar uses transitions such as fade and wipe. The speed of the transition is relative to the speed at which you move the t-bar.

### AUTO BUTTON

An alternative to using the t-bar is the auto button. This comes in handy because there is a consistent transition every time, whereas the t-bar may vary because you are using it manually.

### FADE TO BLACK

Of course, we can't forget about one of the most popular transitions, fade to black. Whatever is on the program monitor will fade to black. Right before starting a program, it's a great idea to fade to black, countdown, press record and then press the black button again to fade up the image. Then, at the end of the program, fade out.

Now that we know the basic controls, let's talk about operation. When we watch the final program, everything looks smooth, but if you look inside the control room or the truck, you see the engine underneath the hood.

## Preparation

The first thing you need to do is set-up. The better the set-up, the more efficient your shooting will be. Here is the process that was used for both the Comcast CN100 and the Bolingbrook Community Television Channel shoots I crewed for. It was pretty much the same whether we were shooting sports or a talk show.

If you can, get in there days before the shoot to prepare. This is where you make sure every program you're going to use is correct. This is also the time to prepare the board and if your board allows it, save your desired settings as a preset. Make sure to save it as a unique number that will not ruin an existing preset. Also, during this preparation, load the templates for your graphics.

The more hands to run the cables, the better. At this point, the crew that needs to be prepping the tapes and the graphics continue that work, but it's great for every other hand to help pull the cables. My producer would be right out there with the rest of the crew, pulling cables through some of the toughest parts. When my father produces his shoots, it's the same thing. It means a lot to see the boss out there doing the dirty work. It boosts crew morale. Make sure you lead by example and don't talk down to your crew. The more hands, the quicker the setup goes, and the more time you have to relax before the shoot. ▶▶




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full screen
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# HOW TO USE A **LIVE SWITCHER**

Set the cameras at the predetermined spots. Try to keep it consistant every shoot. The more consistent, the easier it gets. Make sure the correct cables go to the right cameras. You want to get the camera going as quickly as possible. That way, if you have anything that needs to be fixed, you have ample time to fix it. Check the focus, exposure and white balance. If you are outside, have rain gear handy. Now's the time to set up all of your audio devices as well. Test the strength of the wireless signal and check for interference.

You'll also need to make sure all of your graphics are working and finalized. Make sure the names and titles of all speakers are correct. Practice putting the graphic up through the downstream key (DSK) with the technical director, i.e., the person operating the switcher. The DSK is used for graphics, but may also be used with video such as green screen for a weather report. You'll also need to load your intro in the playback machine. If you connect your computer or mobile device as a video source to the board, you can load videos and play them from there.

## Crew

Before we go live, let's quickly go over the positions. The producer is in charge of the overall production and organization of the shoot, from start to finish. The director chooses the vision and artistic decisions of the shoot. The technical director operates the switch board. Someone is usually responsible for all graphics, titles and lower-thirds and there is typically a tape operator handling all video playback including intros, b-roll and replays. There are also usually several camera operator and grips depending on the size of your shoot. The engineer maintains all of the equipment.

On bigger shoots, the director oversees all of the action in the control room. He relates to the technical director what shots he wants. Everyone in the control room typically communicates with each other through headsets. If there is an announcer, the control rooms voices are muted to the announcer and are only active when something needs to be said. If you have a smaller crew, it's still good to run the protocol, but it's not uncommon on smaller shoots for the role of director and tech director to be filled by the same person.

## Go Live

Now, we're ready! A typical shoot may go something like this:

Director: Roll Tape
Tech Director (TD) puts Tape on preview.
Tape Operator (TO): Rolling. 30 seconds…10 seconds… 5… 4… 3… 2…
Director: Ready Tape and Go to Tape
TD switches the program monitor to Tape by fading from black.
Director: Ready Camera one?

The director asks if the camera is ready in order to give camera one and everyone else a heads up that he likes that shot and that he is about to go to him. Camera one doesn't verbally respond. Sometimes, camera one is not ready and is moving, in which case the director may call out another camera. If you're directing, try to give a little pause to let the camera operator get set.

Director: Take one
TD presses the take button to switch to camera one. At this point, the TD is going straight to the shot and does not need to put something on preview monitor unless they are setting up a specific shot or showing others something on the monitor.

The shoot is rolling smoothly so far. Now, we need a lower third. In preparation, graphics knows this and already has it prepped up.

Director: Graphic ready?
Graphics: Graphic ready.
TD puts the graphic on Preview by enabling the DSK

Director: Graphic out
TD disables graphic.
Director: Ready two, Take two
TD takes two.

Let's say the director wants to switch it up and use fades.

Director: Let's fade. Ready three, Fade to three.
At this point, the TD has a choice. After making sure the transition type on the board is set to fade, the TD can either press auto or use the t-bar to complete the transition.

Director: Alright let's go to break.
Going to break means we are about to stop recording live, usually to show a commercial. The tape operator cues up the commercial. Graphics cues up the next lower third. Camera four gets a bumper, a well framed shot perfect for a lower third, to end on before going to commercial.
TD: Break ready.
Graphics: Graphic ready.
Director: Alright music up. Graphic up. Audio raises the music. TD enables the DSK.

**There are a few options when transitioning between different camera angles. Here, a hand is poised to make the switch using the t-bar, which allows the speed of the transition to be controlled manually.**

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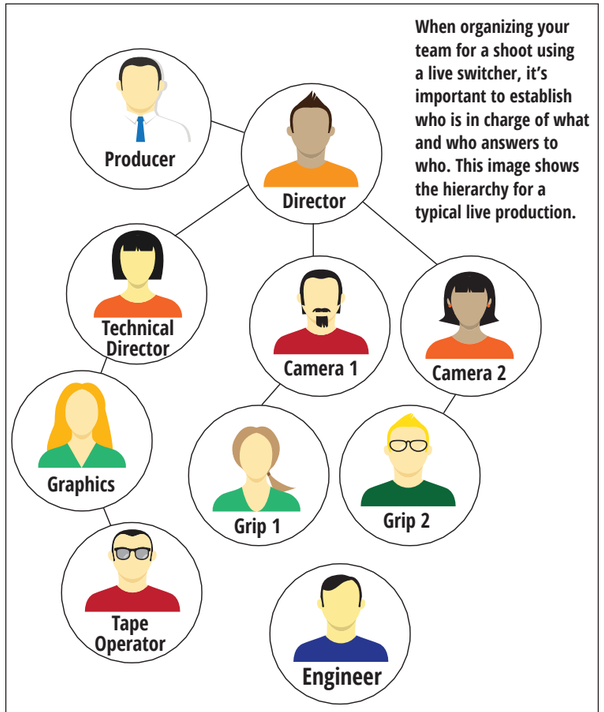
# HOW TO USE A **LIVE SWITCHER**




**When organizing your team for a shoot using a live switcher, it's important to establish who is in charge of what and who answers to who. This image shows the hierarchy for a typical live production.**

Director: Going to break in 3… 2… 1
TD fades to black and cuts to Tape that is now playing the commercial break.

### When to Switch

Switching varies depending on the program. The first rule of thumb is to think like the audience. What does the audience want to see? If we're shooting a talk show, we might start with the establishing shot of the set, also know as the safe shot, usually set up on camera one. What if we don't want the audience to know who we are interviewing yet? In this case, we might start with camera two framing a closeup of our host as they introduce the guest. When they say the guests name, we could switch to Camera three with a closeup of the guest smiling. Camera three may also give us a little push in as we choose her camera. Sure, we want to stay with whomever is talking for the most part, but we also want to see reactions. Keep asking yourself who or what should be the focus. Don't just switch whenever the other person talks or switch without a plan.

For sports or other action filled events, usually camera one is at midfield or center court providing the view we stay on during the play. You want to stay away from switching during the play because the audience needs to see what's going on. Each time there is a cut, especially during action in sports, the audience has to establish the geography and direction. Cuts can be too disorienting when the audience is attempting to follow the action. Right after the play, we go to our hero shot, which is usually camera three or camera four. These cameras usually have a drastically different angle than camera one and so are great for cutaway shots. They stay with the player who made the awesome play. If you're doing replays, they, along with camera two, are also great angles. Camera two is usually similar to camera one, but framed in a tighter shot.

If you're recording a TV show, you cut when the script calls for it, or again, when it feels right based on what the audience should see. You have the advantages of seeing every angle, so make it a point to choose the best one at the appropriate time.

### Enjoy It

Well, there you go. You've completed your live shoot. With more practice and consistency, it gets easier and and the finished recording will get smoother and more polished. One of the joys of going live is working together as a team. There's a lot of bonding that goes on when working for a common goal and knowing you have to be focused because you are recording live. There's no rush like shooting live, so above everything, remember to have fun.

JR Strickland is an award-winning director, filmmaker and musician. He specializes in strong narrative storytelling.

You can comment on this article by going online:
www.videomaker.com/article/17834

## BEST PRACTICES: CAMERA SETUP

**When setting up your cameras, consider which angles will be most useful and most interesting to your audience. Camera one should always be the safe shot. This will be the wide establishing shot that you return to as needed. Camera one should have a great neutral shot framed up as often as it can. The other cameras, however, are constantly searching. Often, when the control room is not on their camera, camera operators will move back and forth, refocusing and constantly adjusting, trying to create the perfect shot. It's not until the director says, "Ready Camera?" that the camera becomes completely stable.**



**Panasonic Lumix DMC-FZ1000**
4K Digital Camera
• 20.1MP 1"high sensitivity MOS sensor • 4K QFHD video recording at 30 fps • Leica DC Vario-Elmarit 16x zoom lens • 25-400mm f/2.8-4 (35mm equivalent) • 2,359k-Dot OLED Live View finder • 3.0" Free-Angle LCD monitor • Built-In Wi-Fi connectivity with NFC • HYBRID O.I.S. 5-Axis image stabilization • High-speed AF with LUMIX DFD focus • ISO 25600 and 50 fps continuous shooting
#PADMCFZ1000B 4K

Blackmagicdesign
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• Active Micro Four Thirds Lens Mount • Super 16mm Sized Image Sensor • Apple ProRes 422 (HQ) at 220 Mbps • 3.5" LCD with 800x480 Resolution • Uses SDXC and SDHC Memory Cards • EN-EL20 Compatible Rechargeable Battery • HDMI, LANC, 3.5mm Audio Input and Output • Records Full HD 1920x1080 CinemaDNG RAW • Portable Design (5" Long & 12.5 oz) • 13 Stops of Dynamic Range
Lens not included
#BLPKCINECAM HD

**SONY NEX-VG900**
35mm Full-Frame Interchangeable Lens Camcorder
• 24.3MP full-frame 35mm Exmor CMOS HD sensor • E-Mount, and A-Mount with included LA-EA3 A-mount lens adapter • 1080/60i/60p/24p • Quad capsule microphone with XLR option • Tru-Finder OLED viewfinder with eye sensor • 3.0" LCD screen • Uncompressed 1080 HDMI Output • Memory Stick PRO Duo/PRO-HG Duo, SD/SDHC/SDXC • Cinematone Gamma with comprehensive manual control
#SONEXVG900 24 Mega Pixels AVCHD

**JVC GY-HM200**
4KCAM Compact Camcorder
NEW
• 1/2.33", 12.4Mp CMOS sensor • Live 4K UHD output via HDMI • 4K Ultra HD 24/30p recording at 150Mbps • 4:2:2 1080p video up to 60p at 50Mbps • Dual SDHC/SDXC \card slots • 3G-SDI and HDMI output • 12x Optical Zoom Lens • Live HD Streaming via optional adapters • Simultaneous streaming and recording
#JVGYHM200 12 Mega Pixels 4K

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4KCAM Handheld S35mm Camcorder (Body Only)
NEW
• Single Super-35mm-Sized, 13.5MP progressive scan CMOS sensor • Ultra HD, Full HD at 4:2:2, SD & proxy • .MOV & AVCHD recording • Dual SDHC/SDXC card slots • 3G-SDI & 4K HDMI output • Built-In wireless streaming • Built-in network remote control • MFT mount supports mount adapters • 3.5" color LCD screen & 0.24" EVF
#JVGYLS300 13 Mega Pixels 4K

**Canon EOS C100 Mark II**
Cinema EOS Camera with Dual Pixel CMOS AF
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Lens not included
Body Only #CAC100AF2 AVCHD

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4K Mirrorless Micro 4/3 System Camera
• 16 MP Live MOS sensor • DCI 4K 4096x2160 at 24p • UHD 4K 3840x2160 at 30p/24p • Full HD up to 60p • 3.0" OLED monitor and OLED Live View finder • Support for 59.94p, 23.98p, 50p, & 24p • 4:2:2 8-Bit or 10-Bit HDMI Output • Built-In Wi-Fi connectivity with NFC • Variable frame rate recording of 2fps to 96 fps capable • Magnesium alloy, weather-sealed body
Body Only #PADMCGH4B
with DMW-YAGH SDI/XLR interface unit #PADMCGH4BK 4K

**SONY Alpha a7S**
Mirrorless System Camera
• 12.2MP full-frame Exmor CMOS sensor optimized for 4K QFHD and low light video • Uncompressed 4:2:2 UHD 4K video HDMI output capable • Compatible with Sony E-mount lenses and many others with adapters • Sony dual XLR microphone kit (optional) • 3.0" tilting LCD monitor and OLED electronic viewfinder • Built-In Wi-Fi connectivity with NFC • Pro-workflow with Picture Profile, S-Log2 and time code • 50Mbps XAVC S2 1920x1080 at 60P, 1280x720 at 120P • ISO 100 – 409600 with low noise and unprecedented 15.3 stops of dynamic range
Body Only #SOA7SB 4K

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**Canon EOS-5D Mark III**
DSLR Camera
• 22.3MP Full-frame CMOS sensor (1.0x crop factor) • 3.2" clear view high resolution LCD / Pentaprism VF • HD 1080 video capture in 30/25/24 fps • HD 1280p video capture in 60/50fps • DIGIC 5+ image processor • 61-Point high density AF • Extended ISO range (50-102400) • Up to 6.0 FPS continuous mode • Built-In HDR and multiple exposure modes • Dual CF and SD memory card slots • Durable magnesium-alloy construction
Body Only #CAE5D3

**Blackmagicdesign Cinema 2.5K / Production 4K**
Cinema Interchangable Lens Camera's with EF Mount
• Canon EF and Zeiss ZE mount compatible lens mount • 2.5K image sensor • 12-bit RAW, ProRes, DNxHD, and CinemaDNG RAW formats • Super wide dynamic range • 5" display size • Variable frame rate recording • Records to removable 5" SSD drives • SDI video output and Thunderbolt Port • Includes DaVinci Resolve and UltraScope • Uncompressed and compressed recording
Lens not included
Production 4K Step-up Features: 4K super 35mm sensor HD
#BLCINECAM..... #BLPRODCAM4K.....

**SONY PXW-FS7**
XDCAM Super 35 Interchangeable Lens Camera System
• Super 4K 35 Single-Chip CMOS sensor with 14 stops of latitude & a wide color gamut • Sony E-Mount • Records internally in 4K up to 60fps in UHD 3840x2160 • Dual XQD memory card slots with simultaneous or relay recording • UHD Up to 60 FPS, HD up to 180 FPS • XVAC-I up to 600 Mb/s, XVAC-L, MPEG-2 • Record 4096 x 2160 via external recorder • Dual HD/3G-SDI & HDMI outputs • Ergonomic SmartGrip handgrip with zoom, start/stop and assignable controls
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- Unobstructed 360° Shooting
- Retractable Carbon Fiber Arms
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- Optical Flow Sensor for Indoor Flying
- Live 720p HD Monitoring with Lightbridge
- Dual Transmitter Operation Supported

*#DJINSPIRE1* — 4K

## GoPro HERO4 Black Edition
POV Sports Action Cam

- Capture Video at: 40K/30 fps, 2.7K50, 1440p80, 1080p120, 960p120, 720p120
- Capture 12MP photos at 30 fps
- Advanced (2x) more powerful processor
- Wi-Fi and Bluetooth Connectivity
- Housing Waterproof to 131'
- Auto Low Light and Night Photo Modes

**Hero4 Silver Edition Features:**
- Supports 4K/15 • Built-In Touchscreen Display

**Black** *#GOH4AB* ..... **Silver** *#GOH4AS* ..... — 12 Mega Pixels

## SONY FDR-X1000V
4K Action Cam

- Supports 4K, 1080p, 720p, and 480p Video
- Ultra-wide 170° FOV lens
- Wi-Fi for remote monitoring and control
- Housing waterproof to 33'
- 8.8MP stills with burst / interval modes
- 120 fps in 1080p and 240 fps in 720p
- XAVC S and MP4 (H.264) recording
- 4K (3840 x 2160) recording using the XAVC S codec
- Automatic In-Camera Editing

*#SOFDRX1000V* — 4K

## Panasonic HC-X920
3 CMOS Flash Memory HD Camcorder

- 3x 1/2" back-illuminated CMOS sensors
- 12x optical, 25x advanced Leica Dicomar lens (f/1.5 maximum aperture)
- Record to SD/SDHC/SDXC media
- Remote WiFi mobile device tether plus Ustream sharing
- Manual controls
- 3.5" (16:9) LCD screen & color viewfinder
- 3D recording capable with optional Panasonic VW-CLT2 3D lens
- Optical image stabilizer • Microphone & headphone input

*#PAHCX920K* — 20 Mega Pixels — 3D — AVCHD

## JVC GC-PX100
HD Everio Camcorder

- HD 1920 x 1080p recording
- SC/SDHC/SDXC memory card slot
- 3" touch panel LCD
- 1/2.3 back-illuminated 12.8 MP CMOS sensor
- 29.4mm f1.2 wide angle lens
- Optical image stabilizer with A.I.S.
- 10x optical zoom & 16x dynamic zoom
- Supports shooting speeds up to 600 fps • Built-in Wi-Fi
- Capture still images in bursts of nine frames a second

*#JVGCPX100* — 12 Mega Pixels — HD

## SONY HDR-CX900
HD Handycam Camcorder

- 1" Exmor R CMOS sensor with BIONZ X image processor
- 1080p Video and 20 MP still images • XAVC S, AVCHD, and MP4 recording
- 0.39" OLED viewfinder/ 3.5" XtraFine LCD • Built-in Wi-Fi/NFC connectivity
- Zeiss Vario Sonnar T* 12x zoom lens (24x clear image zoom)
- BIONZ X Processor / High Speed 120 fps
- Optical SteadyShot image stabilization
- One-touch NFC smartphone pairing
- Built-in ND filters: Clear, 1/4, 1/16, 1/64

*#SOHDRCX900B* — 20 Mega Pixels — HD

## SONY FDR-AX33
4K Ultra HD Handycam Camcorder

- 4K Ultra HD 24p/25p/30p & 20.6MP stills
- 29.8mm Zeiss Vario Sonnar T* zoom lens
- 10x optical & 20x Clear Image zoom
- 1080p Up to 60fps
- Exmor R 1/2.3" CMOS sensor
- Bionz X image processor
- Balanced Optical SteadyShot
- Wi-Fi / NFC connectivity
- 5.1 channel surround sound microphone
- 3.0" LCD Touchscreen / 0.24" color EVF

*#SOFDRAX33* — 4K

## Panasonic HC-WX970
4K Ultra-HD Camcorder with Twin Video Camera — NEW

- 1/2.3" Back-Illuminated MOS Sensor • Articulating 5.27MP Secondary Camera • 20x Optical Zoom / 50x Intelligent Zoom
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- HDR (High Dynamic Range) Video Recording
- Capture 4K Frame Grabs from Video
- Wi-Fi for Remote Operation and Live View

*#PAHCWX970* — 4K

## Canon VIXIA HF G30
HD Flash memory Camcorder

- Full HD 1920 x 1080p Recording at 60 fps
- Canon 2.91MP 1/2.84" HD CMOS Pro Sensor
- Canon 20x HD Video Lens (3.67 - 73.4mm)
- Record in MP4 (35Mbps) or AVCHD (28Mbps)
- Optical Image Stabilization
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- OLED 3.5" touch Panel display & joystick • Color 0.24" Viewfinder

*#CAHFG30* — AVCHD

## Canon XA10
Professional HD Solid State Camcorder

- 64GB Internal and Dual SDHC/SDXC card slots with relay recording
- 1920 x 1080 CMOS Image Sensor
- Canon 10x HD Video Lens
- 8-Blade Iris and Manual Focus Ring
- DIGIC DV III Image Processor
- 24Mbps Recording (AVCHD)
- 3.5" High-resolution touch panel LCD and EVF
- Dual XLR terminals

*#CAXA10* ..... **$1,499.00** — AVCHD

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Professional HD Camcorder

- 1/2.84" HD CMOS sensor with RGB primary color filter
- 20x HD Zoom Lens • 2x SD/SDHC/SDXC card slots with relay and dual recording
- Canon Digic DV 4 image processor
- Built-in Wi-Fi technology with FTP transfer capability • Optical image stabilization
- 3.5" LCD screen and color viewfinder
- 2 phantom-powered XLR audio inputs
- Native 24p and slow- and fast motion recording

**XA25 Step-up Features:** HD/SD-SDI output • Pre-record 3-sec. buffer

*#CAXA20* ..... **$1,999.00** *#CAXA25* ..... **$2,499.00** — AVCHD

## Panasonic AG-AC90A
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- 3.5" LCD screen & LCOS color viewfinder
- Six scene presets, and seven programmable user buttons
- Interval Record, Pre-Record, Record Check, Last Clip Delete
- AVCCAM HD Recording Modes • Two-Channel XLR Audio Inputs

*#PAAGAC90A* — AVCHD

## SONY FDR-AX100
4K Ultra HD Camcorder

- 1" Exmor R CMOS sensor with direct pixel readout
- XAVC S, AVCHD, and MP4 recording options
- 4K ultra HD video at 30 fps
- Zeiss Vario Sonnar T* Lens
- 0.39" OLED EVF
- 3.5" XtraFine LCD
- Wi-Fi / NFC connectivity
- Optical image stabilization

*#SOFDRAX100* — 15 Mega Pixels — 4K — HD

## Panasonic HC-X1000
4K DCI/Ultra HD Camcorder

- 1/2.3" 18.47 Mp MOS sensor
- Supports 4K, Cinema 4K and full-HD with variable frame rates (30p, 60p, and 24p) • Wi-Fi / NFC Connectivity
- Two Venus image processing engines
- Leica Dicomar 20x optical zoom lens
- Individual focus, zoom & iris lens rings
- High bit rate quality (4K-150Mbps / 2K-200Mbps)
- Power O.I.S with built-in gyro sensors • 0.45" Electronic Viewfinder
- 3.5" LCD Touch Screen • Record MP4, MOV, AVCHD to SDXC Cards

*#PAHCX1000K* — 4K

## Canon XF100 / XF105
HD Professional CF Camcorders

- 1/3" CMOS 1920 x 1080 CMOS sensor
- Dual CF card slots
- 50Mbps MPEG-2 recording
- Canon's MPEG-2 4:2:2 color sampling
- 60p/60i, 30p, 24p MXF File Format
- 10x HD zoom lens
- 3.5" 920K dot LCD monitor
- Stereoscopic 3-D recording capabilities
- Dual XLR inputs • Waveform Monitor

**XF105 Step-up Features:** HD/SD-SDI, SMPTE Time Code, Genlock

*#CAXF100* ..... **$2,499.00** *#CAXF105* ..... **$2,999.00** — AVCHD

## Canon XF200 / XF205
HD Professional CF Camcorders

- 1/2.84" CMOS (1920 x 1080) sensor with RGB color filter
- 20x zoom lens with zoom, focus, iris rings
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**XF205 Step-up Features:** HD-SDI, 3G-SDI, Time Code, Genlock

*#CAXF200* ..... *#CAXF205* ..... — HD

## SONY NEX-EA50M
NXCAM HD Interchangeable Lens Camcorder

- Advanced Exmor APS HD CMOS sensor
- 18-105mm f/4 constant aperture Servo Zoom G lens
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*#SONEXEA50M* — AVCHD

## Panasonic AG-AC130A / AG-AC160A
3-MOS HD Handheld Camcorders

- 3x 1/3", 2.2 MP CMOS sensor - 18-bit dsp
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- 22x optical zoom lens
- Dual SD/SDHC/SDXC card slots
- AVCHD & DV recording (SD) modes

*AG-AC130A*

**AG-AC160A Step-up Features:**
- HD-SDI & LPCM audio recording
- 59.94 Hz / 50 Hz switchable
- Slow/quick motion recording mode

*#PAAGAC130A* ..... *#PAAGAC160A* ..... — AVCHD

## SONY FDR-AX1/PXW-Z100
Digital 4K Camcorder

- 1/2.3" back-illuminated Exmor R CMOS Sensor • 3.5" LCD screen
- Dual XQD Memory Card slot
- Records 4K video resolutions (Up to 3840x2160 60P/50P)
- 20x Sony G-Series zoom lens
- Records in 2K and 4K: 60p, 50p, 30p, 25p, 24p
- Video format XAVC S format, MPEG4-AVC/H264 • XLR audio Input

**PXW-Z100 Step-up Features:** • 4K XAVC Intra 422 MXF •3G-SDI • Slow & Quick • Wi-Fi Remote

*#SOFDRAX1* ..... **$4,499.00** *#SOPXWZ100* ..... **$5,499.00** — 4K

## JVC GY-HM600 / GY-HM650
ProHD ENG Camcorder

- Three 1/3" (1920 x 1080) 12-Bit CMOS sensors
- Dual SDXC/SDHC card slots, dual-backup, continuous recording
- MPEG-2 / AVCHD / H.264 Recording
- 23x Fujinon wide zoom lens
- F11 Sensitivity • Optical image stabilizer
- 3.5" LCD screen with focus assist • HD-SDI and HDMI connections

**GY-HM650 Step-up Features:** WiFi with Apps for iOS/Android, Live transmission (streaming), Secure FTP File upload via WiFi

*#JVGYHM600U* ..... *#JVGYHM650U* ..... — AVCHD

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062015

# HOW TO MATCH CAMERAS

Even seemingly simple footage is actually quite complex. There is a blend of elements, from grain and noise, to exposure and white balance. **When shooting with multiple cameras, how can footage be matched between them?**

BY RUSS FAIRLEY

It's event day. The keynote speaker is the honchiest of head honchos, the A/V team has fed clean audio to one of the three cameras capturing said honcho. Shots are framed, beads of sweat form…fingers tremble… it's showtime.

Few things match the reward of good event video production. The preparation that goes into each one of them to ensure that, when the moment comes, cameras are ready to roll is immense. Pro event teams plan meticulously, design a look and feel for an event and choose equipment or contractors accordingly.

### Cut to a studio shoot.

Large monitors display the feeds from the handful of DSLRs on set. The talent is in position. The lights are set. The camera bodies and lenses are all the same make and model.

### What needs to be done before hitting record?

Of course, each scenario is different. Differences in venues, budgets, goals and even subject matter can influence the size of a video team, the equipment that arrives on shoot day and the personnel manning each camera.

When everything is said and done, and it's time to capture a multi-camera video, or when working in a live-switched environment and pumping the video feed out to giant screens or a management team overseas, those cameras had better match up.

Whether we know it or not, properly matched capture from each of our cameras is not only the right thing to do, it is a professional expectation. When camera teams are hired to cover an event or shoot a corporate video and multiple cameras are to be used, there is an unspoken understanding that the footage from each device will match.

Even if the client doesn't yet realize it's a consideration, it's already a requirement.

There are effective ways in post-production to match footage between cameras, but the focus here is to ensure that what is captured between more than one camera is as close to matching as possible.

### What needs matching?

Before hitting buttons, holding things up in front of the camera and playing with settings, it's important to identify the qualities of a moving image that need to be considered to create a match.

Primarily, they are exposure, shutter speed, noise and/or grain and white balance. Some cameras make adjusting these settings simple. Other cameras hide these settings away in deep, dark menus.

Either way, it's important to know the gear, and adjust it properly to push the images being captured as close to one another as possible.

### How to Set up Equipment for Matching

Matching cameras starts before heading to the set or event. Choosing equipment for a multi-cam shoot can be as much about matching camera images as it is about capturing a specific look or feel.

That said, this first point might seem like a no-brainer, but ideally the cameras are the same make and model. This isn't always possible, but two Canon 5D Mark III DSLRs with matching settings are going to put the images in the same ballpark right off the bat, particularly if using the same lenses. The second best is using cameras of the same make, different model, but with the same or a similar sensor, like the Sony




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EX-3 and EX-1. Plenty of other camera manufacturers have lines of cameras with similar or matching sensors throughout the lineup. For interchangeable lens cameras, matching the lenses will certainly help, too.

If they're the same camera, with identical settings, they should match, right? They'll be closer than totally mismatched cameras, but not necessarily perfect. Many camera models are manufactured over a number of years, from different facilities with differing conditions and subtle updates over time.

Lenses can also differ. Two identical lens models, constructed at different times or from different facilities, using different cleaners, coatings and constructors, can produce images that look a fair bit different.

**Matching a DLSR to a camcorder can be tricky, but with the right settings, it's possible to get them reasonably close. The camcorder cannot achieve the same shallow depth of field as the DSLR, so we'll use it for the master image, shown at the top. In the middle, we see an image from the DSLR set at f/4.0 and ISO 100. Here, the trees in the background are much too soft. To match the deep depth of field and noise of the camcorder, use a smaller aperture and higher ISO, such as we see in the bottom image, which was shot at f/20 and ISO 3200.**

If it's impossible to bring matching equipment, choosing all of the camera settings prior to the shoot and then monitoring and adjusting prior to shooting will make the difference.

The best bet is to try to make enough time to test and work with the cameras prior to a shoot starting to at least get them close. Usually the larger the budget, the more setup and testing time there will be, but even with no lead time, possessing a basic knowledge of how to set up cameras is important.

## The First Step: Frame Settings

The first settings to set on each of the cameras will be the frame size and rate. Most North American shoots these days are in 1920 by 1080 with a progressive frame rate of 23.976 fps (24p) or 29.97 fps (30p), with the pro market trending toward UHD and 4K frame sizes.

Choose the frame size and rate that the project is to be delivered in and set each of the cameras to exactly those settings.

## Shutter Speed/Angle

Next, ensure the shutter speed, also referred to as shutter angle, of each of the cameras is set the same. Shutter speed has a huge impact on the appearance of finished footage. Action sequences can benefit from overly quick shutter speeds, but a good starting place is generally around double the frame rate of the camera.

Therefore, if you're shooting at 24p, set the shutter to 1/48 (or 1/50 on some cameras), at least as a starting point. There may be a need to speed it up or slow it down slightly, but this is a good launch point.

The term "shutter angle" is a reference to older rotary shutters, where a disc would angle to let light in. The larger the angle, the slower the shutter speed. Although modern cameras don't use rotary shutters, the term has hung on as a simple and known way for those who make video to describe the appearance of motion blur. If the desired effect is a subject or subjects that are blurred for a greater percentage of their frame-to-frame displacement, then your choice would be a larger shutter angle. The opposite also applies.

So, why double the frame rate when choosing a shutter speed?

The rule of thumb for doubling the frame rate with the shutter speed comes from the same school of thinking as shooting in 24p. Achieving a cinematic look involves a number of elements, and the most common shutter angle setting for cinema is around 180 degrees, which equates to a shutter speed near 1/48 of a second at 24 frames per second. A larger angle, and the blur extends too close to the blur in the previous and next frames, causing a smearing effect. A smaller angle leads to a more stuttered appearance resulting from the blur gap.

Other factors, such as subject movement, will play a part in choosing shutter speed and angle, but start out there and adjust to suit the scene, just make sure to use the same setting across all of your cameras.

## White Balance

Cameras are highly capable pieces of equipment but require some assistance in understanding how to interpret a scene. For instance, show a human being a white piece of paper, and they can tell that it's white whether it's in a dimly lit room or out in the bright sun. While a camera can compensate for either scenario, it needs some help to do so.

Each camera is different, but there should be tools for white balance on board. Most have a number of presets, and the more professional models will allow for custom white balancing, where a white card is held in front of the camera and set as the white that is recognized by the camera.

The key is to set the cameras to a similar setting to ensure that they're close. If they all offer custom white balancing, that is obviously the best option.

Often, there will be a few options using numbers in degrees Kelvin. Those numbers refer to color temperature, which can be adjusted to accommodate certain scenes in much the same way a consumer camera will offer white balance presets to handle different environments.

In very basic terms, color temperature describes the apparent warmth or coolness of light. Simply, the lower the color temperature, the warmer the image. Roughly speaking, 2500-3500K represents the reddish, orange-y hues given off by tungsten bulbs, 3000-4000K is the oranges and yellows of sunrise, 5000-6500K moves away from the yellows into the blues of clear daylight, 6500-8000K is like the blues and greys of overcast daylight and 8000-10000K is like the darker blue-grey of shaded daylight. If a shot is too blue and needs warming up, the color temperature is likely too high for the camera's white balance settings.

There's a lot more to color temperature and tint, but a basic understanding of color temperature will help decide on a video's look and feel before starting to match up cameras. It also helps troubleshoot differences in looks.

## ISO

ISO is an in-camera exposure setting, along with aperture and shutter speed. While some high-end cameras that shoot RAW footage can have exposure tweaked a bit in post production, setting ISO properly in-camera is essential.

Raising a camera's ISO basically makes dimmer portions of a shot lighter. As that ISO number increases, the camera is amplifying and filtering the signal before the clip is recorded, meaning whatever the effect of the ISO setting is gets baked into the captured footage. Therefore, it's important to be thoughtful when adjusting ISO. Adjusting it too high can increase noise and reduce dynamic range in a shot. Neither of these things are good for post-production.

Adjusting the camera's ISO to be as low as possible while delivering a nice, balanced image is key. Start with each camera set to the same ISO level and adjust. Many cameras have a default ISO, but the environment, lens characteristics, sensor characteristics or other factors can determine whether the level needs adjusting to more closely match other cameras.

## Overall

These basics are key, but there is a very important lesson about shooting on a set or at an event that supersedes all others: When there are multiple operators, they must communicate effectively. If everyone stands at their camera and says "I'm at 1080 30 – everyone else at 1080 30?" the chance of missing a setting are slim.

Create a procedure or ritual for the beginning of each shoots. Once the cameras are set up and operators are at their stations, call out each critical setting and have each operator call back his or her camera's setting. Make sure it all matches, then check each unit to determine how close they appear.

It's going to be very difficult to get cameras exactly identical from simply adjusting settings and comparing monitors, but these basics will help get the process started. It's all about getting them as close as possible to minimize the work that will need doing in post-production.

Russ Fairley is a writer, producer, musician and avid ***Videomaker*** reader.

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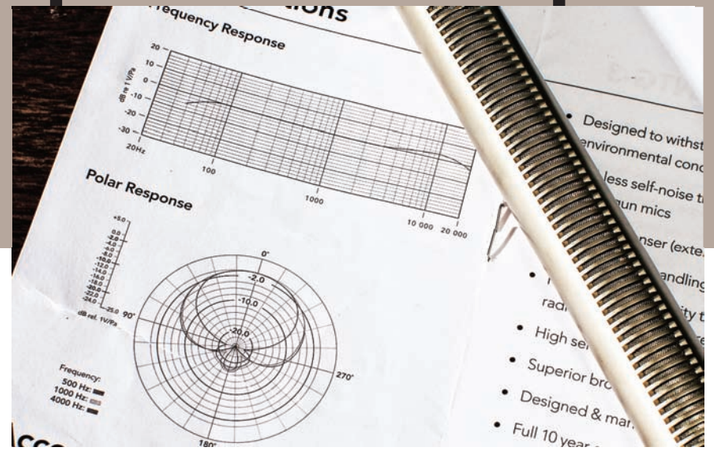
by David G. Welton

# How to Decipher Mic Tech Specs

**Have you ever struggled choosing the best microphone for a particular situation? Let us demystify mic specifications to give you the power to make the best choice.**




Not all microphones are created equal. Some are better at recording distant sounds, some excel at recording the human voice, others do an amazing job of ignoring unwanted background noise. Every shooting situation requires a careful pairing of a mic's strengths with the challenges the setting presents.

This article will help you make sense of microphone specifications so you can pick the best mic for any situation. You'll also acquire the knowledge needed to make informed purchases.

## Sound Force

Have you ever stood in the front row of a rock concert? If so, you have literally felt the acoustic energy emitted from the speakers as the powerful sound waves washed over you. The loudspeakers on the stage convert electrical energy into acoustic energy.

The task of a microphone is the functional opposite — to take acoustic energy and convert it to electrical energy. This process, called transduction, is the conversion of one form of energy to another. Examples of transducers abound in modern life. Solar panels on a roof convert the energy of light to electrical energy. A light emitting diode (LED) converts electrical energy to light.

Early microphone transducers used carbon or crystals to perform their magic. Today, there are three popular types of microphone transducers: dynamic, condenser and ribbon. Let's look at the features and pitfalls of each.

### SLUGGISH SOUND OF THUNDER

Thunder and lightning illustrate the fact that sound travels relatively slowly. You see a distant lightning flash several seconds before you hear the sound of the thunder clap. Sound's sluggish movement creates headaches for audio engineers.

For example, if a mic is too far from the source of the sound in a large room, the microphone will pick up the sound as it reflects off the walls, floor and ceiling. This phenomenon results in sound reaching the mic at slightly different times — creating an unpleasant muddled effect.

The solution is to always place the mic as close as possible to the source of the sound. This minimizes the effect of sounds that bounce around and reach the microphone late.

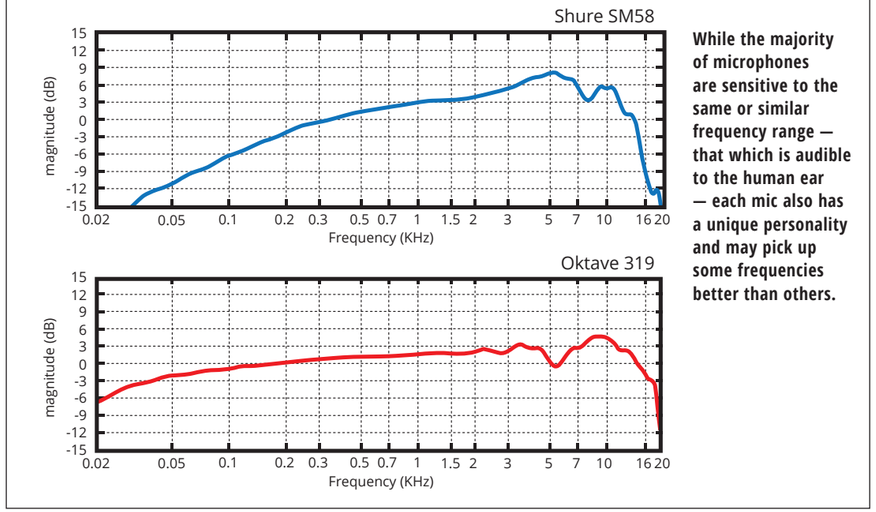
## Dynamic Mics

First, let's explore the dynamic mic. It is sometimes referred to as a moving coil mic, which is a more descriptive name. Inside the mic, wire twisted into a coil moves within a stationary magnet as sound waves strike the mic.

You may remember from science class that a coil of wire moving within a magnetic field produces electricity — this is how generators make power. By the same principle, dynamic mics actually produce electricity, albeit a very small amount — sadly, not enough to solve any energy shortages!

Many dynamic mics are of the handheld variety, like the legendary Shure SM58. This $100 mic has been a favorite for live vocal performances since its introduction in the 1960s. Dynamic mics are generally affordable, offering many choices under $250.

One problem with dynamic microphones is their size — they cannot be tiny. If you want to hide a miniscule mic on an actor, look to the next mic transducer type.




**While the majority of microphones are sensitive to the same or similar frequency range — that which is audible to the human ear — each mic also has a unique personality and may pick up some frequencies better than others.**

## Teeny Tiny Mics

Condenser mics, sometimes called capacitor mics, can be very small. These are the microphone transducer types found in cellphones and laptop computers. They're great at capturing quiet sounds or sounds at a distance. The functionality of your cell phone's speakerphone feature is testimony to the power of the condenser mic.

A condenser microphone can take the form of a handheld studio mic or the tiny one attached to the clothing of a news anchor. The studio variety typically mounts on a stand and can offer high-end audio quality. The cost of a condenser mic varies widely, starting at about $150 and rising into the thousands.

Unlike the dynamic mic, the condenser mic requires external power to operate. The power can come from a mixing board through the mic cable — called phantom power. More often, a battery supplies power to the mic. In the case of the mic in a laptop or cellphone, the power comes from the host device.

## At Home in the Studio

The final mic transducer type we'll explore is the ribbon. Ribbon microphones excel at recording the human voice with warmth and clarity. Historically, ribbon mics have been relegated to studio use because they are generally both expensive and fragile.

Their fragility comes from the uber-thin metallic ribbon inside the mic. This ribbon vibrates when sound reaches it, but, if the sound is too loud, the fragile ribbon will break — not good. A few newer ribbon mics are affordable and even handheld, but most still live in a studio. A professional quality ribbon microphone will set you back a minimum of $1000.

## Polar Patterns

No matter what you are recording, there is usually some sound you want to avoid capturing. Say you are shooting a new scene for a situation comedy web series that involves an actor delivering lines on a noisy subway station platform. In this scenario, you want to avoid recording the sounds of other people talking, subway trains and undesirable background noise. Read on for the solution.

The polar pattern of a microphone refers to its ability to accept or reject sounds coming from different directions. Some people call this the pickup pattern of a mic — an apt name since it defines what sounds the mic will pick up.

Microphones that ignore sounds from some directions are very common. Dubbed "unidirectional," they attempt to capture sound from only

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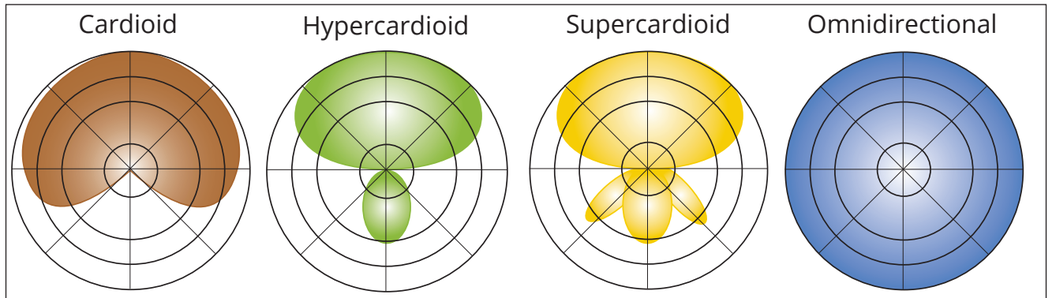


**When choosing the best microphone for a given situation, be sure to consider which pickup pattern will be most appropriate for the kind of sound you are trying to capture. For example, an omnidirectional mic, while great for capturing ambient sound, may not be the most effective option for an interview in a noisy environment. In that situation, a micrphone with a cardioid or hypercardioid pattern would be a better choice.**

one direction. These mics — commonly called cardioid — have a pickup pattern that loosely resembles the shape of a heart.

A unidirectional mic does a great job of avoiding ear-shattering feedback in a live vocal stage performance. It rejects sounds coming from the speaker system for the audience. The Shure SM58 mentioned earlier is an example of a unidirectional mic.

Supercardioid and hypercardioid mics do an even better job of rejecting sounds from the sides of the microphone. These extremely directional mics excel at capturing sound that is a significant distance away — like a bird singing in a far off tree.

For our filmmaker on the subway platform, a supercardioid mic would be an excellent solution. This could take the form of a shotgun mic — its name derived from its barrel-like appearance. This mic solves the problem: The filmmaker can position it out of range of the camera's view and in a manner that avoids capturing most unwanted sounds.

Other microphones have an "omnidirectional" polar pattern. This means that they pick up sound from essentially all directions. A few mics even offer a switch that changes the polar response between uni and omnidirectional.

"Bidirectional" mics pick up sound from two directions. These are ideal for an interviewer and interviewee sitting directly across a table from one another. This polar pattern also goes by the name of "figure-eight."

**This Audio-Technica microphone includes both XLR and USB outputs, increasing your connection options. When choosing a microphone, look at what connections your existing equipment can accommodate and how you plan to use the microphone.**

## Tech Specs

Most manufacturers publish data on a mic's frequency response, sensitivity, maximum SPL (sound pressure level), noise and other key specifications. Unfortunately, these specs are only as dependable as the measurement procedures the manufacturer uses — there is no standard. Be especially careful when comparing mics from different manufacturers.

A microphone's frequency response specification describes its ability to capture sounds throughout a range of frequencies. For example, human speech typically ranges from around 125 to about 6,000 cycles per second — measured in Hertz (Hz). Most mics capture the majority of the approximately 20 to 20,000 Hz range of human hearing. Nonetheless, the unique personality of a particular mic might make it better suited for recording a snare drum rather than a saxophone.

The sensitivity specification of a mic defines its ability to capture quiet sounds. Typically, the condenser mic offers the greatest sensitivity compared to the other transducer types, making it the only choice for the speakerphone in your smartphone — so there's no need to yell into it (hint, hint). Dynamic mics typically come in second, with ribbon mics relegated to last place in transducer sensitivity.

> THE ONLY WAY TO TRULY KNOW IF A MIC WILL WORK IN A GIVEN SITUATION IS TO ACTUALLY GIVE IT A GO.

A microphone's SPL numbers describe its ability to record loud sounds. The noise numbers depict the hiss and other unwanted noises the mic adds to the audio signal — lower numbers are better.

Professionals use low impedance mics with XLR connectors. These cables offer good protection from picking up unwanted electrical noise — like the electric drill in a neighboring room. XLR cables also allow the flow of phantom power to a condenser microphone. Avoid high impedance mics that typically have 1/4-inch or 1/8-inch connections, especially if the cable has a long run.

The best advice is — if possible — try before you buy. The only way to truly know if a mic will work in a given situation is to actually give it a go.

David G. Welton is a professor of Media Studies.

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by Arthur Lance

# What Makes a Story Marketable?

**We review techniques that writers and video producers can use to craft engaging stories that will generate revenue and gain traction with a broader audience.**

One of the first steps for any video producer is to figure out how to craft a good story — and not just a good story, but one that sells. As anyone getting into the field will know, there are countless moving parts when it comes to creating video content for the masses, from equipment and logistics, to crew and continuity. No video content will succeed without that starting point — the germ of a compelling and salable story. In this article, we'll look at how to write a story that can satisfy viewers, gain an audience and ultimately make money.

## Target Audience

While modern technology has made it easy for the average Joe to shoot a video, viewing film as a business takes a certain perspective. The order in which you tackle the construction of your story may vary, but the first thing to remember is that you need an audience. We all have ideas and want to see our creative ambitions come to fruition, but those ambitions will burn out quickly without an audience to fund our dreams. Ask yourself: Who do you want your audience to be? Are you aiming for a broad audience or a more select, niche viewership?

A broad target audience means you are casting a wide net based on things such as age range, ethnicity or geography. Sometimes starting with a broad target audience can help you to suss out your true long-term audience by seeing what resonates most with people so that you may gradually narrow your audience. A niche target audience, on the other hand, is specific. You are aiming to capture the attention of a small subset of people, so you'd better make sure you know your target audience well. The benefit to this approach is that you have the chance of capturing the loyalty of a dedicated group of followers who are more likely to follow your projects and are willing to pay a higher price for your targeted content. There is also the potential to build your audience gradually by consistently hitting your target niche.

Based on your target demographic, you must also consider what format your story will take on the screen. Will it be a feature production or a short film? Will it be a television series or an advertisement? Although each format will vary in length and complexity, the thing that will hold all of this together is ultimately your story structure.

### THE ELEVATOR PITCH

When trying to appeal to investors, it's important to have a brief story pitch ready to succinctly convey what your script is about and why it is worth funding. We call this type of pitch the "elevator pitch" because it should be able to be delivered to someone important in the time it takes to ride an elevator, i.e., thirty seconds to two minutes. When prepping an elevator pitch, try to distill your story to its purest elements. Include a brief plot summary and an emotional hook to grab attention. Referencing other notable works can sometimes work in your favor. Breaking Bad was originally pitched as "Take Mr. Chips and turn him into Scarface."

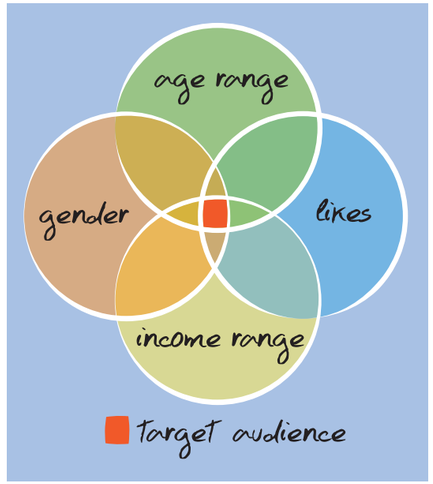
## Setting

Consider the setting of your story. Are we in a sleepy Midwestern town? A sprawling urban city? Is it a place where the sun shines or does a gray fog hug the streets alongside the distant roar of the ocean? A story's setting will immediately draw your viewers in and cue them in on what to expect tonally. Many writers say that their stories grow out of their settings, and often the location your characters inhabit becomes almost a character in and of itself.

## Characters

Characters are the crux of the action in almost any tale, so it's important that you have at least one that the audience can identify with, otherwise they will lose interest quickly. Note that your character doesn't necessarily need to be likable — though it can help — but there must be qualities in his or her journey that your target audience can relate to, someone to whom they can look and ask, "What if that were me? What would I do in their position?"

In your cast of characters, you should identify who is going to be a major player and who a minor player. We sometimes call these "round" and "flat" characters. Round characters are your main players. They will be three-dimensional, possessing personality traits both good and bad. They will be dynamic, challenged and undergo changes throughout the course




**Often, your core viewership will sit at the intersection of several larger categories. The diagram above depicts one strategy for determining your target audience.**

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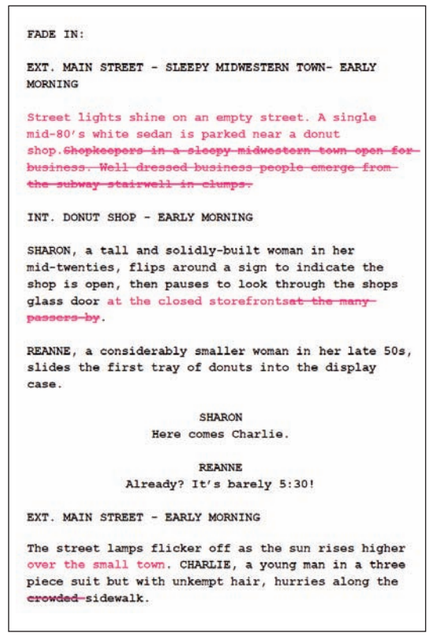
of your story. Flat characters posses broader, more categorical qualities and will remain mostly static.

While it's not always essential to have a clear-cut protagonist and antagonist, these are familiar roles that will go a long way to helping your audience relate to your story. What does your protagonist want? What drives them or doesn't drive them? What are they willing to do to get what they want? Crucially, you should avoid the pitfall of trying to explain everything about your character in a monologue. Film is a visual medium, and people want to see what your protagonist is made of through action, not just a wall of dialogue. The best way to reveal your protagonist's traits is by placing them in new situations and showing your audience how they react to these situations. What happens when your protagonist and antagonist meet? How do your characters react to stressful situations? Do they remain calm in the face of adversity? Do they get angry? Do they run away?

## Structure

Now that you have your characters, it's time to watch them evolve. People come to stories for conflict and emotional resonance. Stories —



FADE IN:

EXT. MAIN STREET - SLEEPY MIDWESTERN TOWN- EARLY MORNING

Street lights shine on an empty street. A single mid-80's white sedan is parked near a donut shop. ~~Shopkeepers in a sleepy midwestern town open for business. Well dressed business people emerge from the subway stairwell in clumps.~~

INT. DONUT SHOP - EARLY MORNING

SHARON, a tall and solidly-built woman in her mid-twenties, flips around a sign to indicate the shop is open, then pauses to look through the shops glass door at the closed storefront ~~at the many passers-by~~.

REANNE, a considerably smaller woman in her late 50s, slides the first tray of donuts into the display case.

SHARON
Here comes Charlie.

REANNE
Already? It's barely 5:30!

EXT. MAIN STREET - EARLY MORNING

The street lamps flicker off as the sun rises higher over the small town. CHARLIE, a young man in a three piece suit but with unkempt hair, hurries along the ~~crowded~~ sidewalk.

**Whether it's a love story or a murder mystery, setting will inevitably influence the tone and structure of the narrative. Make sure the setting you choose is appropriate for the story you are trying to tell.**

**"Community" creator Dan Harmon knows the importance of pushing characters out of their comfort zones in the name of compelling story structures.**

both our personal ones and those we absorb from the world around us — are what make us who we are, and the starting point for any story is the process of change. Even web series or television sitcoms, which often like to "reset" their characters at the start of each episode to a greater or lesser extent, are propelled by conflict and change. Dan Harmon, creator of cult hit TV-show "Community" puts it like this: Your character is going to want something. They will have to step outside of their comfort zone in pursuit of it, adapting to new challenges along the way. They will undergo changes as they approach their goal, then they will journey back to the life they once knew, emerging with new-found knowledge and power. This is the tale of descent and return so common to folklore and narrative of days past.

Another simplified way to view story structure is via the three-act structure. A popular template for beginning writers, it breaks the fictional work into three parts — the setup, the confrontation and the resolution. While this can be a good starting point, it is often criticized for its simplicity and restrictiveness.

## Pacing

Now we come to the question of pacing. Just as a dump of expository dialogue can kill your audience's interest, so can an endless stream of action scenes. Thus, it is important to establish a good rhythm to your writing. You'll want to have a mix of faster and slower scenes. As your story progresses, keep giving your characters new sources of conflict. Raising the stakes keeps a narrative vital and can be achieved in many ways. For example, your protagonist may have a limited amount of time to reach his goal, and as the clock ticks down, the pressure builds up. As more is revealed about the protagonist's life, we may find out more about what drives them, and in doing so we as the audience will find more tension as we understand what is at stake for them. What do they stand to gain and what do they stand to lose?

Try to eliminate fluff in your plot-line. That is, each scene should be placed deliberately and have something to contribute to both the external, surface-level action, and the internal action, e.g., characterization and subtext. This does not have to be apparent to your audience right away, but it's essential to informing character motivations and actions down the line. Alfred Hitchcock once said that a good story was, "Life, with the dull parts taken out." If you place a lot of irrelevant scenes in your script, your audience will quickly lose interest.

> AS YOUR STORY PROGRESSES, KEEP GIVING YOUR CHARACTERS NEW SOURCES OF CONFLICT.

## Write

All of this is to say that, while there is no one correct way to write a story, there are certain universal elements of storytelling that will appeal to your consumers — and we are all consumers of stories. It's in our blood. As you sit down to write your next script and strive to make it both your own and something that people want to see, keep in mind these storytelling tips, which will help you craft your own unique vision into a piece of video content that truly resonates with people — and that they are willing to pay to see.

Arthur Lance is a freelance writer and student of Film and English.

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by Jeff Chaves

# Let There Be White

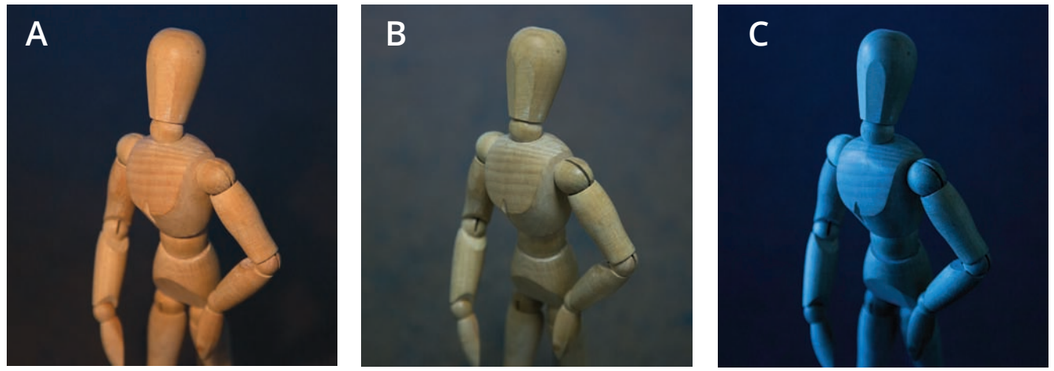
**White balancing under even light is one thing, but what about white balancing under lights of mixed color temperature? A few simple tools are the keys to not getting burned by lighting.**

When is white not really white? When it's headed toward an unprepared camera sensor. Understanding the color difference between light sources is critical to getting the best look from your camera.

A stroll through your neighborhood at night can reveal some important differences in color temperature among artificial light sources. As your eyes adjust to the dark, observe the different colors of light around you. Those little solar lights in the garden seem to be more blue. The light coming from the house fixtures looks more orange. That kitchen window seems almost green. Those street lights look almost pink. Your brain tells you, though, that each of them is white light.

Science tell us that light is a vast spectrum that ranges from what we see into the invisible infrared and ultraviolet light. In between is the entire rainbow of colors, graded by color temperature on the Kelvin scale. On this scale, incandescent or tungsten light sits at about 3200 kelvin (or 3200K for short). Sunlight varies as it travels across the sky but is placed generally at 5600K. At dawn and dusk it's actually warmer, or more reddish, meaning, counterintuitively, that it has a lower color temperature. On an overcast day, daylight has a higher color temperature, leading us to perceive it as cooler, or more blue.

While your brain automatically corrects for these differences in color temperature, your camera does not. It simply records the color that enters the lens. Yes, digital cameras have an automatic white balance setting, but if your location has multiple light sources, you might get some strange results. It's during these times that you learn the hard way that you can't always fix it in post.




**For each image above, the camera was white balanced for tungsten light, but only Image A shows the wooden figure under a tungsten light source. Image B shows the same figure under florescent light, while Image C depicts the effect a daylight balanced light source.**





## Some Expert Advice

We interviewed John Turner, the Technical Services Manager for KLAS-TV in Las Vegas, Nevada. He attended the USC School of Cinematographic Arts and has been in broadcast television since 1985. He has done production in all types of situations, from wars and natural disasters to court cases and presidential inaugurations.

John tells us his most challenging lighting situations are theaters:

"Typically speaking stage lighting burns me every time. Stage lighting can be a combination of all temperatures combined in one scene. So, what will you set as the primary temperature?"

Most stage lights are tungsten, but not all of them. Some theaters may have spotlights that are HMI (Hydrargyrum medium-arc iodide) and are the same temperature as daylight. You may also find newer LED lights that can be changed to cover much of the spectrum. In addition, theatrical lighting can also be colored using thin, heat resistant plastic called gels. All of this can play havoc with digital cameras.

So what does Turner recommend in a theater?

"Balancing and balancing often will need to occur as temps will most certainly change."

## Balancing Act

The first step is learning how your camera white balances. You will need to find something that is white or at least neutral, like a piece of paper, and place it in front of your camera. For a typical digital camera, there will be a setting in your menu or a separate button. In DSLR cameras, white balancing can be a little more complicated. Check your user's manual for the details. The key is to make sure your white is being lit by the main light source. Don't turn your camera onto a white wall, for example, as it may not be getting the same light as your subject.

It's a good idea to experiment with your camera in different situations. You need to be comfortable white balancing and know what results you will get. Try going into a kitchen and shooting the same subject in several lighting situations. First, turn off all the lights and open all the window covers around noon. White balance the camera and record a few seconds. Next, try it again at dusk. Then, turn on an overhead light fixture or two and try it again. Finally close all the curtains, or wait until dark, and use

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**Color-adjustable LED lighting options make working in varying color temperatures more feasible. This light, for example, allows you to shift from 3200K to 5600K with just the turn of a knob.**

all the available lights. Play back your video and note the differences.

## The Right Look

John Turner tells us that ultimately white balance is going to be based on the look that you want to achieve. "Ask yourself what is important with this image? What am I trying to say? This will help you know what is most important about lighting."

He tells us that in journalism, the choices may be different than in cinematography. "News photographers tend to want to keep their photography as pure and as natural as possible. "Keeping it pure" means going with what you have and adding nothing artificial. So, what is the object you are shooting and what is the prevailing temperature."

Look carefully at what you are focusing on and notice what light is hitting the subject. What is the dominant light source? Let's say that you're shooting in an office with a giant picture window on your subject's side. There are also fluorescent lights overhead and a tungsten desk lamp. The dominant light source is probably the big window. Try turning off the overhead lights and the desk lamp, if that is possible, and white balance for the daylight from the window.

## A little correction goes a long way.

How would John Tuner handle that office shot?

"I will use a light with a 5600K filter or gel and then white balance for an outside exposure." He says that color correction is the key.

You can correct lighting color with some simple tools. One tool is the lamp or bulb in your lighting fixtures. A trip to your local hardware store will reveal a wide variety of choices in florescent tubes and even common house lamp bulbs. If you have a more advanced light kit, there are most likely different color temperature lamps available. Make sure that you at least keep 3200K and 5600K lamps on hand.

Another basic correction is the gel. A few sheets of gel on hand can be a game changer. Place these thin sheets in front of your light to instantly change the color temperature. If you have a light that gets very hot, make sure the gel is away from direct heat because they will melt. There are large sheets of gel available to cover an entire window if that's what you need.

Thanks to LED lighting, there are some new lights that have adjustable temperature settings. Turner says, "They are small, powerful, take less power, are color correctable with the turn of a dial and they don't get hot. A small LED light can make all the difference in the world when those mixed light issues arise."

## Learn the basics.

Finally, John says that being observant and always learning are vital habits. He also offers a unique perspective: "Learn the fundamentals of natural audio, lighting, composition, framing, and editing. What do audio, composition, and framing have to do with lighting? EVERYTHING. Audio has as much to do with your lighting as the looking at a hot fudge sundae has to do with how it tastes. What is being said and how it sounds will influence your lighting design and concept, and set the tone for the condition."

The lesson here is to be observant of the light around you and learn from your lighting mistakes.

### A RANGE OF OPTIONS

The companies that make gel to color theatrical lights also make gels to correct the color of fixtures. The options are:

- **CTB (color temperature blue)** is used to raise color temperature of tungsten fixtures to match daylight's 5600K.
- **CTO (color temperature orange)** is used to lower color temperature of daylight to match tungsten's 3200K.
- **Minus Green** is used to remove the green spike of fluorescent bulbs to match other light sources.
- **Plus Green** is used to add green spike in tungsten or daylight balanced lights to match fluorescent lights.

Gels are sold in increments or grades. For example, one of the leading suppliers is Rosco, and they make their CTB (Called Cinegel) in Full, 3/4, 1/2, 1/4, etc.

Jeff Chaves was trained in video production in the Army and has been involved in the industry for more than 25 years. He and his wife run Grace Pictures Inc.

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by Russ Fairley

# Why Your Action Cam Shots Stink

**Action cameras can do more than ever before, capturing crazy frame sizes at high frame rates. The possibilities are practically infinite, so why does your action cam footage stink?**

Photo courtesy of GoPro

Ok, here's the situation: You picked up an action camera from the local big box store, brought it home and went to work filming the next Red Bull Challenge. You charge up the battery, insert a memory card, step out the front door and get started. After running around the yard, suction cupping the camera to anything with a smooth surface, wearing it as a human hood ornament atop your head and capturing a bike ride through the forest with the camera on the handlebars looking back at you, it's time to pull that footage off the memory card and build a masterpiece.

The only problem is that the footage looks like junk. Shakes, weird angles, that darn sun not cooperating.

But hang on just a tick. This is 2015. Action cameras can shoot 4K video, capture stereo audio and operate underwater. Some of them cost a cool five hundo before buying mounts. How could a few minutes of manic behavior exceed the capabilities of one of these little cameras?

The first mistake is forgetting that a camera is a camera is a camera (is a camera).

This year's NAB marked the 10-year anniversary of GoPro's first camera, the GoPro HERO 35mm All-Season Sports Camera. That camera weighed half a pound, lived in a clear case like current models, could work in about 15 feet of water and included a roll of 24 exposure Kodak 400 film. Things have come a long way, but reflecting on the GoPro as a film camera back in 2005 is a

**The ubiquitous selfie stick may be the butt of many jokes, but in practice, the utility of this versatile mount is hard to deny. In addition to allowing you to capture both high and low angle shots otherwise out of reach, using a pole mount can also be a great way to reduce distracting camera shakes.**



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stark reminder that cameras are cameras. The fundamentals still apply, whether using a Contour HD, a GoPro HERO4 or an ARRI ALEXA Mini.

So what went wrong with your shoot? Let's look at how some of the drawbacks of action cameras — and how ignoring some basics can lead to stinky shots.

## Shake, Rattle and Roll

One of the issues that tiny cameras like our favorite action cams face is that there isn't a lot of room to work with in those small casings. The likelihood of optical image stabilization is minimal, and the very form factor lends itself to situations where extreme shake could occur. They're small, light and easy to swing around, so the temptation is to put them in positions where they can really go for the gold. They can be mounted to a hockey stick or atop a skateboard. While taking an approach of putting the camera right in the action can lead to shots that were nearly impossible to achieve with grampa's old 16mm, there will be situations where camera shake can become the unintended dominant subject in a shot.

To combat shake, there are a few solutions. The first is to practice fundamentals of handheld shooting to develop an understanding of what effect camera shake has on footage.

Additionally, there are many tools on the market today to smooth out action camera footage. Gimbals, steadicams, thousands of mounts and one of our favorites, the selfie pole.

Ok, so it's not just for selfies. Mounting an action camera to a pole is a surprisingly effective technique for smoothing out shots. The pole minimizes the small shakes and movements that direct hand-holding can cause, and the extra length adds options for capturing cool sweeping shots, follows, lifts and glides, mimicking a crane or jib.

The trick with these small cameras is to use some imagination when looking for creative stabilization methods. One cool trick to try is to hold the camera against one of the best, most naturally stabilized objects on the planet: the human head. That's right. Hold the flat backside of a GoPro against your face and take some shots — the minute shakes and jiggles will be smoothed out.

## The old rules still apply.

Ok, so our footage is smooth. Fewer bumps, shakes and nausea inducing pans. That was part of the problem, but the footage still stinks. It's boring to watch and doesn't feel right.

Going back to the concept that a camera is a camera (repeat as necessary), it's important to remember that putting a Monster Energy Drink sticker on a camera doesn't strip it of its properties. It still shoots footage at a certain frame size, and shots should still be composed properly — or at least composed with intention. The always-ultra-wide field of view makes it easy to ensure that a subject is in the shot, but that doesn't mean the shot is right.

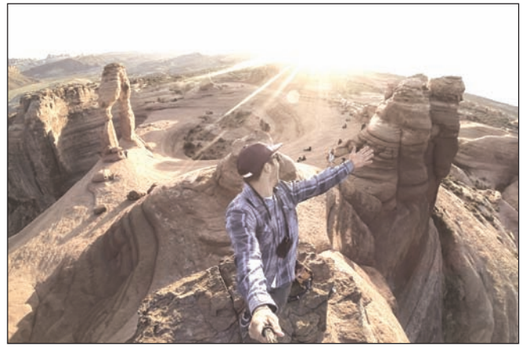

Photo courtesy of GoPro

**Exposure can be a big challenge when dealing with cameras with few manual controls. An ND, or neutral density, filter can be extremely useful in evening out exposure and avoiding the washed-out look we see in the image on the left.**

**While there is a certain appeal to the immersive realism of a smudged lens, keeping your camera free of dirt and grime ensures a clear view of all the action. Make sure to check regularly for any undesirable obstructions.**

While there are no hard and fast rules and composition guidelines are regularly broken to great effect, keeping composition basics in mind while shooting can make a huge difference in the quality of your image.

Of course, these basics become tricky when duct taping a GoPro to the handlebar of a Jet Ski and jumping over a flotilla of flaming barrels, so what is a shooter to do?

Plan, and plan some more. That's right. Put down the Red Bull, take off the Oakleys and get out a notebook. Draw some pictures of the vision in your head.

> USE SOME IMAGINATION WHEN LOOKING FOR CREATIVE STABILIZATION METHODS.

While the scale of your production isn't likely to match GoPro-sponsored driver Ken Block's Gymkhana series, there are good lessons to pull from how his team captures his insane stunts. On these shoots there is a massive planning effort, not only on the part of the driving, but on how to shoot the driving in the best way possible.

One of these shoots can involve as many as a hundred GoPros, along with a handful of Canon DSLRs and an ARRI. Figuring out composition on 110 cameras is a huge, essential effort. These aren't the kinds of shoots where you want to have to do a dozen takes. Many GoPros are harmed in the making of these videos, and often the first take has to work.

So plan your shoot like Ken's team. Think about what would make for the absolute best shot, draw out some ideas for angles to try, and take some test shots. Sometimes environmental factors will still hurt a shot. It may be too dark to get a good shot on the underside of a skateboard, or high wind may add shake to a camera not mounted firmly enough. It doesn't hurt to take some test shots to see whether your planning is going to work. Even if some footage ends up on the cutting room floor, the keepers will be that much better thanks to planning.

Oh, and along the lines of environmental factors playing a role in getting good footage, the very nature of action cameras puts them in some dirty situations. Keep an eye on how clean lenses, cases and enclosures are. A spec of dirt on the lens can ruin a shot. Don't notice it for the whole day and kiss that time goodbye.

## Making Good Shots Better

Ok, so now we're getting somewhere. At least the shots are looking closer to the vision in your head. We're dialing



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Photo courtesy of GoPro

**Ken Block and his team make sure they get the most dynamic action shots possible by planning thoroughly in advance. That way, when the adrenaline gets pumping, Ken can focus on the action rather than the action cam.**

back the stink. What other things can be a consideration when trying to get great action camera footage?

Well, there are a few. Most action cameras, like DSLRs and other specialty cameras, lack built-in ND filters to help with exposure in bright environments. While action cameras, like DSLRs, flourish in daylight, they can have trouble dealing with things like overly bright sunlight, which can cause highlights

> PUT DOWN THE RED BULL, TAKE OFF THE OAKLEYS AND DRAW SOME PICTURES OF THE VISION IN YOUR HEAD.

in shots to blow out. The solution is to look for external add-on ND filter options for the action camera you are using. Some companies offer them, some don't. If they don't, however, a little creativity, a plastic ND gel and some tape ought to do the trick. Just make sure it's affixed in a tight and flat manner over the lens to avoid distortion.

Another trick to making shots look great is to figure out the strengths of the camera. Search those difficult little menus and read user manuals to ensure that every drop of awesome is being squeezed out of that camera.

Sometimes overlooked are the amazing high frame rates many of these cameras are capable of. Shooting at a higher frame rate means much smoother slow motion is possible when editing. There are many resources online to help with slow motion and a technique called "speed ramping," where footage goes between playing back at full speed and into slow motion over a period of time, or vice versa. In action sports, the frame rates are often ramped quickly and cause a very dramatic effect. Learn these tricks and your footage will be on it's way to being an action dynamo.

The last shortfall of the action camera that can affect production value is crummy audio. Most of these cameras have pretty weak audio to begin with, particularly those cameras whose microphones live inside a waterproof encasement. Most manufacturers offer an external audio option, though do some research. Many of these options will add some bulk to a set up, and there's always a cost involved. Depending on the subject, there may be an option to add audio in post-production. Inexpensive options for sound effect and music libraries make audio in post fun.

Sound design is a skill often overlooked by casual hobbyists and even some pros, but it's worth taking on. Getting audio just right on a production can really be rewarding.

## And finally...

Ok, things are looking amazing. Planned, stabilized shots are allowing extreme action to actually look better. Funny how that works, isn't it? Control leads to better results, even when capturing the craziest action conceivable.

This is a fundamental attitude when working with camera equipment. There will always be a way to bend or break the rules, but it's often more fun to break the rules on the drawing board before flying by the seat of your pants on set. You'll end up happier with the shot if a few minutes of planning go into it. Besides, planning shots is fun work. Dreaming something up and then putting yourself to the test to see if it's possible adds challenge and builds skills.

So there it is. Plan, envision scenes and shots, stabilize the camera by choosing the right mount — or pole — for the job and then see how close you can get to your dream shots. Whether working with a GoPro or a RED EPIC WEAPON, have fun, try hard, put in the work during the planning phase and your footage will cease to stink.

Russ Fairley is a writer, producer and musician.

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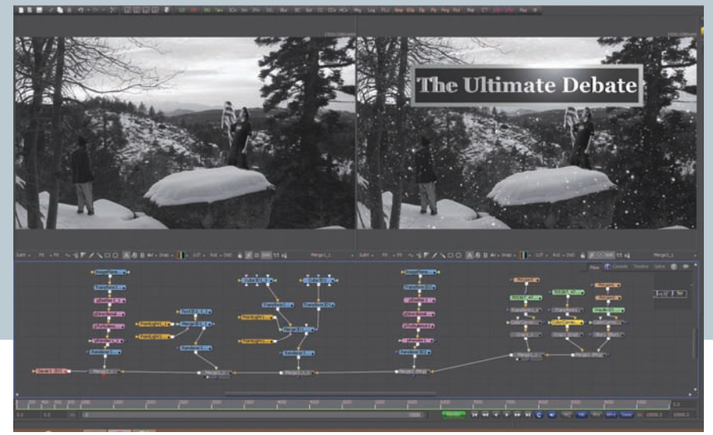
by Weland Bourne

# Nodes vs. Layers

**While one could argue over which is better, nodes or layers, the answer will usually come down to software application preference. We'll look at both systems and explain why each is awesome and where they just don't make the cut.**




In most editing software, you use tracks. Tracks are different from layers in that tracks can hold numerous elements, such as multiple video clips, and each video clip can have multiple effects layers attached to it. In some editing software, you can even attach effects layers to the tracks.

## Layers

A layer is a singular level inside a layer-based software. This singular level can be anything from a video layer to an image. Each effect is also represented individually as a layer. Layers can be combined into bins, directories and groups. In some layer-based applications like After Effects (AE), you can nest entire compositions, consisting of layers and groups, into other compositions. Additionally, effects like blur and color correction can be applied to each individual layer. However, if you want blur and color correction on all layers, you will either have to duplicate the effect multiple times or nest it into a new composition. As a direct result of the need for nesting, projects can become quite large, difficult to navigate and unruly.

## Layers in Adobe

It's no real secret that the reason layers are talked about in the visual effects world is the ubiquity of AE and Photoshop. In fact, most node based software companies assume you have used either Photoshop or AE before ever touching their software. The real question is, why switch from layers if it is so prevalent? The biggest point of contention is, as mentioned before, the bigger your project gets, the harder it is to deal with in AE.

## The Value of After Effects

If you do motion graphics frequently, the ability to create simple, fast graphics quickly and easily is unparalleled in AE. Its integration with Photoshop makes it even more appealing. People who edit on Adobe Premiere will also find the interconnection to be highly convenient. Last but not least, people often find it very hard to switch from layers to nodes. If you are accustomed to using layers, there's a steep learning curve for nodes; you'll probably find that, initially, nodes are not very user-friendly.

## Nodes

A node is a singular level inside a node-based software. This singular level can be anything from a video to an image to a solid. Nodes in groups are called networks. Nodes can contain their own networks. Effects like blur and color correction have their own nodes. All you have to do is connect the blur node to the node of whatever you want to blur. If you want something else to have the same blur, just connect the blur to that as well. One change to the blur will affect both nodes as long as they are both connected. Unlike layers, you don't have to change the blur for each layer. This is important for big visual effects shots where you can have anywhere from ten to one hundred nodes or layers. If you decide you don't like the blur on one node, just delete the connection to that node. The blur will still continue to affect all other nodes.

## Nodes in Fusion

Currently, Fusion 7 is a free software download from Blackmagic Design, so it provides the perfect opportunity to learn about nodes. The grid in Fusion's node layout makes it very easy to organize your nodes, even for beginners.

Take a look at our example. Does a node-based composite in Fusion look scary? It might, but once you understand how it works, it's so simple, you will be shocked to find



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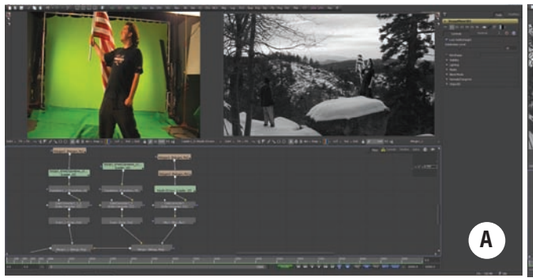

that creating graphics takes longer than actually compositing.

If you look at the images we've created, out of the 45 active nodes, only 16 of them are used for the composite. If you look at Image A, you will notice those sixteen nodes clearly displayed. In the upper left of Image A, you will notice the original green screen. The image to the right in Image A is the finished initial composite.

In Image B, we once again see the finished initial composite as well as the final shot. You will also notice that all 47 nodes are displayed to give an idea of the scope of the node network for the shot. The green nodes are files — an image, footage, or even an image sequence. The tan nodes are all roto or matte layers. The gray nodes are adjustments like transform, blur, color correction, etc. Blue are 3D nodes. Fusion, like most node based compositors is in a 3D environment. The pink nodes are particles. The gold nodes are light for the 3D. The nodes in a line at the bottom are all merge tools leading up to the saver node, which is pretty much an exporter or render node.

For those who are looking to do large scale projects with network rendering, Fusion 7 Studio is available for purchase from Blackmagic Design at an affordable price considering its size and scope.

## Nodes in Nuke

Nuke is probably the most frequently used software for high-end visual effects for feature film, TV, commercials and music videos. It's reliable, stable, and has the most plugins of any of the node-based applications. What sets Nuke further apart are its unparalleled keying tools. If you've ever purchased a plugin from the Foundry for AE, such as Keylight, you'll find it works the same way in Nuke. Of course, Nuke comes with a high price tag, which is why Nuke is used almost exclusively by visual effects professionals. The Foundry has a free 15-day unrestricted trial version of Nuke. They also offer a personal learning edition (PLE) of Nuke with limited features for free, if you want to try it out for an extended period of time.

## The DaVinci Resolve Hybrid

DaVinci Resolve, in some ways, is a hybrid using the best of both layers and nodes. When using DaVinci, you have a normal editing track-type system, allowing you to cut and edit as if you were in a NLE. However, your color correction, compositing and effects are node based inside the clip. Think about any editing system; when you double click a clip and open effects, instead of having layers, you have node networks. This comes in handy if you are doing heavy amounts of color correction and compositing in clips. What makes Davinci Resolve so convenient is that you can do all your color correction, composites and effects without having to leave your editor. Last but not least, if you wanted to apply a tint node, you can apply it directly to the track itself, and it affects all the clips in the track. Currently, you can purchase DaVinci Resolve or get it free with most Blackmagic camera purchases. Davinci Resolve Lite can be downloaded for free at Blackmagic Design's website. The Lite version is actually fairly comprehensive; the biggest difference between the two versions seems to be network rendering capabilities and work with 3D footage.

## The Smoke Hybrid

Autodesk, known for industry standard 3D software Maya, has their own hybrid, Smoke, for Mac OS only. Like DaVinci, it includes a normal track-type system for editing and a node system for compositing. If you're working heavily in Maya or 3D Studio Max, you might prefer the easy integration with Smoke, but it does come with a hefty price tag that will probably relegate it to professional use only.

## Nodes or Layers: Which is better?

To be honest, there is no right or wrong answer. They both can achieve the same effects. Software preference will factor greatly into your decision. The more that you use one software type, the more you will become accustomed to that system. Just remember that layers are not great for huge projects with many items and effects; likewise, projects with little footage and few effects are sometimes not the most efficient for nodes. What it really boils down to is personal preference. A great rule of thumb is go big and go nodes or keep it small and stick with layers.

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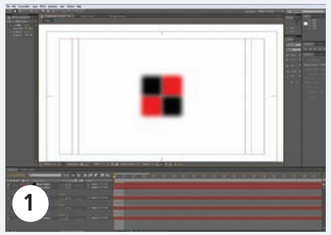
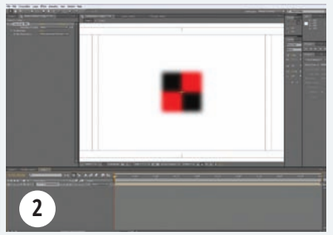
### NESTING IN AFTER EFFECTS

Nesting is a confusing feature in layer-based systems such as After Effects that many users don't fully understand. The best way to illustrate the use of nesting is a simple square test. In layers, when you apply a blur, you apply it directly to the layer. This blur is unique to the layer it's on. To apply this blur to a second layer, you would have to copy and paste the effect into another layer; however, any changes you make to one blur would not affect the other. When you do this, you are not bluring the whole image but rather the layers themselves. As you can see from Image 1, when you blur all the squares individually, you get bleed from the layer below — note the grey between the black and red areas. When you nest the composition and use blur, you blur the whole image. Image 2 demonstrates how the blur should look when done correctly. Proper nesting affects things from color correction to most layer effects. If you are having problems with an effect that you have tried to paste to multiple layers, chances are that you should be nesting instead.









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# PRODUCTION TIPS

by Russ Fairley

## The Challenges of Professional Freelance Video Production

### Don't be upset if your client gives you the axe. Go get yourself a better tree.

"Thanks for making videos for us all these years, but our intern has a camera of their own, and we're going to take it from here."

Whether this exact scenario has happened to you, or something similar, there are ways to deal with it and ways to not deal with it.

One of the issues our industry faces, as hardware, software, and quality training become more accessible, is that anyone can do it. Our phones have cameras. Best Buy sells enough stuff to make basic videos. More and more people have, at least on some level, experimented with making their own videos, and that's a great thing.

But, when faced with replacement we can feel hurt — taking the change personally as an assault on our skills and background, but it's not that. Our skills weren't what took the client to this place. They're being cheap. Existing staff is already a large cost, and their thinking is to roll up your cost into an existing one.

On paper it looks good. A minus B equals C. Great. We saved B.

The variable that isn't being considered is this: you've taken the time and invested the energy necessary to take your production skills out into the market and sell them. Youv'e learned enough to operate your equipment, understand client needs, dream up creative ways to help them express their visions, and, most of all, you have done work at a level that is saleable.

The intern has not. Well, there's always a chance that they have, but if they wanted to be a video professional, it would be strange for them to be in a different role.

Let's assume that they do not have professional video experience. Maybe they have created a Wordpress website, and shoot for a fashion blog. Good experience, and a good way to learn a thing or two about video, but fashion blogs and Wordpress sites do not form the basis of a pro.

The types of knowledge that go into video production go far deeper than what the everyday blogger needs to know, and this is the message that your client needs to understand, whether they choose to continue working with you or not.

In a typical small-budget video production — and let's face it, if you're being replaced by the intern, or Dan in Accounting, you're not making big budget videos for this client (if you are, they're even more nuts) — a freelancer has a lot to do. They need to prep

> SELL YOURSELF ON THE KNOWLEDGE, SKILLS AND CAPABILITIES YOU POSSESS.

equipment, shoot a video, offload footage, possibly transcode said footage, ingest footage into an editing application, edit the work, add effects, transitions, motion graphics, titles, fix audio, correct color, render, upload to a website for collaboration or hand deliver for review, accept revisions, revise video, re-render, re-upload, etc., etc., etc. all the while using thousands of dollars of equipment that you've had to purchase over time just to be considered legit enough to sell video professionally.

With that in mind, how do you line up against the intern? Probably pretty favorably. Each one of the points that went into making that video involved an investment in time, energy and possibly money to reach a level that made people want to buy your videos.

Sell yourself on the knowledge, skills, and capabilities you possess, differentiate yourself with the service and white glove experience you can provide and offer plenty of options for doing more if they so choose. Sell your value, and don't sell your soul to keep the business. If the client is intent on saving a grand a month, they're not the right client.

Or maybe they're not the right client right now. My company has had a number of retainer clients over the years, and a couple of them have made the decision to try making their own videos. I presented my value proposition to them, reminded them of the years of great service and pro video productions we created together and wished them well, leaving the door open for any future work. As of today, one of them is still using their graphic designer, a very talented person with a great eye for shot framing who had a background in DSLR photography, and the other gave up on their experiment after about six months and resigned with my company.

Clients come and go, and situations are always going to change, but the lesson is a good one for freelancers: know your business inside and out, learn your clients' business as best you can, do your best work on each and every project, and always under-promise and over-deliver.

The clients that matter will come back, and you'll pick up more of the right ones over time if you never sell yourself short. Remember this for each project you quote: high speed, high quality, low cost. They can pick any two.

I guarantee 90% of their internal resources can only offer one.

Russ Fairley is a writer, producer and musician.

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